

INTERNAL REVIEW  
SITE ASSESSMENT GROUP CERCLIS DECISION RECORD

Site Name: Howe Richardson Scale Co (Former)

CERCLIS #: VTD 002078509

Site Assessment Product Reviewed: PA SI Other \_\_\_\_\_  
9-21-98

State Coordinator: (1) Don Smith Date: 9-28-98

SAG Reviewers: (2) Matthew A. Audet Date: 9/29/98

(3) \_\_\_\_\_ Date: \_\_\_\_\_

(4) \_\_\_\_\_ Date: \_\_\_\_\_

Recommended CERCLIS Decision:

Reviewer (1) (2) (3) (4)	NFRAP - No Site
Reviewer (1) (2) (3) (4)	NFRAP - No Waste
Reviewer (1) (2) (3) (4)	NFRAP - Petroleum Only
Reviewer <del>(1)</del> <u>(2)</u> (3) (4)	NFRAP - Low HRS Score
Reviewer (1) (2) (3) (4)	NFRAP - Other (Explain Under Comments)
Reviewer (1) (2) (3) (4)	Defer to RCRA/NPC
Reviewer (1) (2) (3) (4)	Continued Investigation Under CERCLA

Comments Reviewer (1):

Comments Reviewer (2):

Comments Reviewer (3):

Comments Reviewer (4):

# SITE INSPECTION WORKSHEET

(Region I version 6/30/95)

## WARNING!!

EPA has determined that the HRS score of any site that is progressing towards listing on the NPL is confidential. Deliberations regarding scoring or listing issues, the site specific status, and HRS scores cannot be released or discussed with non-Agency persons. For additional guidance see the April 30, 1993 OSWER Directive 9320.1-11.

## SITE LOCATION

Site Name: Howe Richardson Scale Co. (former)

Street Address: 1 Scale Avenue

City: Rutland

State: VT

Zip Code:

05701

Telephone:

802-773-6251

CERCLIS ID No.: VTD002078509

Coordinates:

Latitude: 43° 36' 2.0" N

Longitude: 72° 58' 30.0" W

## OWNER/OPERATOR IDENTIFICATION

Owner: Howe Center Ltd.

Operator: Howe Center Ltd.

Owner Address: 140 Granger Street

Operator Address: 140 Granger Street

City: Rutland

City: Rutland

State:

VT

Zip Code:

05701

Telephone:

802-773-6251

State:

VT

Zip Code:

05701

Telephone:

802-773-6251

## SITE EVALUATION

Agency/Organization: WESTON/START

TDD No.: 98-05-0035

Investigator: Mr. Pasquale Panza

Date: 21 September 1998

## EPA CONTACT

EPA SAM: Mr. Donald Smith

Address: JFK Federal Building

City: Boston

State: MA

Zip Code:

02203

Telephone: (617) 573-9648

EPA Reviewer:

*D Smith*

Date:

*9-28-98*

*Final*

## GENERAL INFORMATION

**Site Description and Operational History:** Provide a brief description of the site and its operational history. State the site name, owner, operator, type of facility and operations, size of property, active or inactive status, and years of waste generation. Summarize waste treatment, storage, or disposal activities that have or may have occurred at the site; note whether these activities are documented or alleged. Identify all source types and prior spills, floods, or fires. Summarize highlights of the PA and other investigations. Cite references.

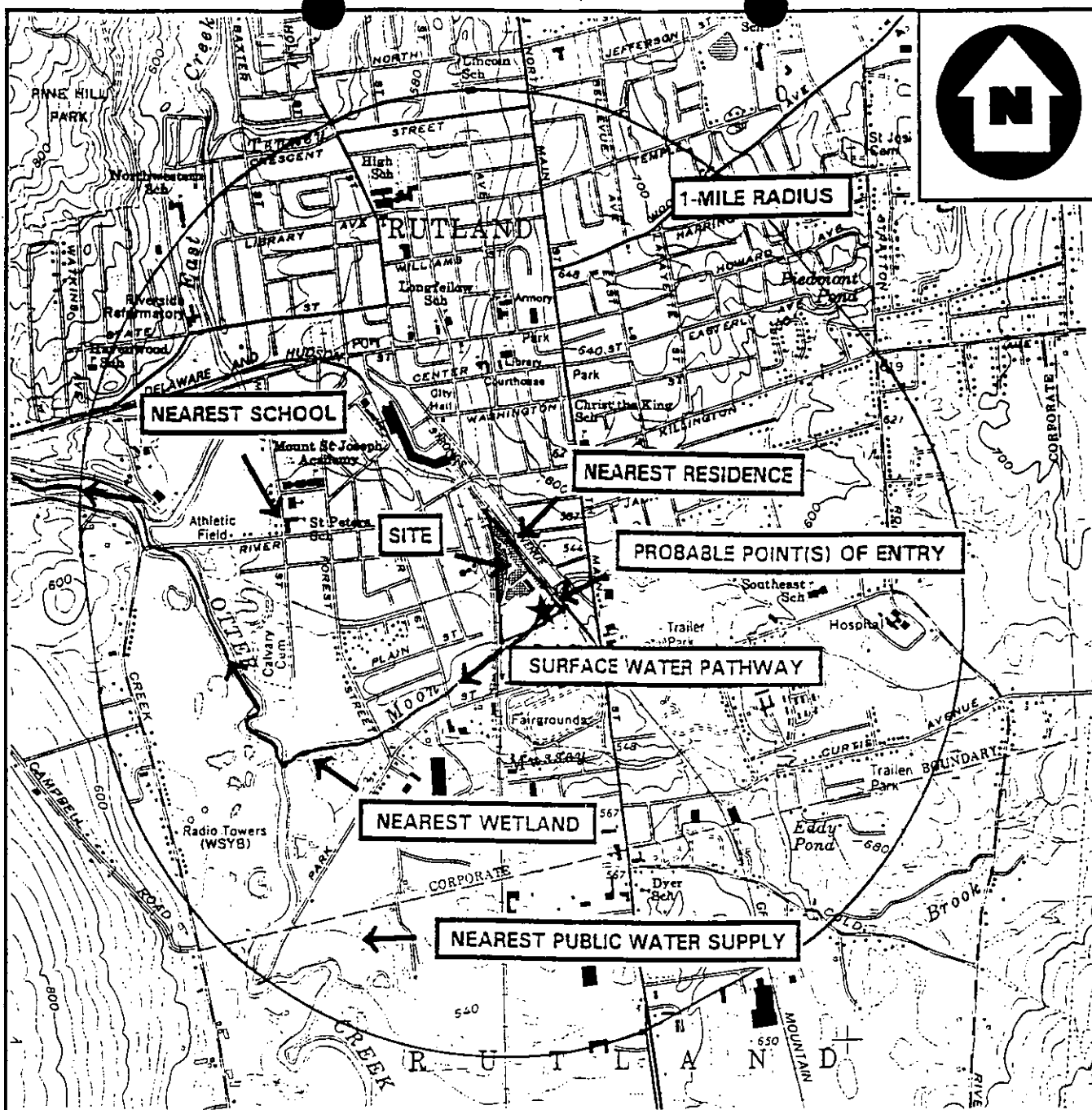
The Howe Richardson Scale Co. (former) (Howe) property is located at 1 Scale Avenue in Rutland, Rutland County, Vermont at coordinates 43° 36' 2.0" north latitude and 72° 58' 30.0" west longitude (Figure 1). The property is identified by the City of Rutland Tax Assessor's records as Tax ID No. 088033. The parcel is zoned as industrial and is bound by Moulthrop Avenue to the southeast, a business located at Porter Place to the south, a residence located on Park Street to the southwest, Moon Brook to the southwest, and by railroad tracks to the north, east, and west (Figure 2).

*Howe was established in 1857 and had a 125-year history producing large industrial scales and balances at this location ending in 1982. Howe was formerly owned by PJD Inc., which is a subsidiary of Aerojet Investments Limited of Sacramento, California, and is no longer located on the subject property. The Howe property was on the real estate market from 1982 until Howe Center Ltd. (HCL) purchased the property in 1989. HCL is the current operator and is responsible for managing the property. HCL employs Giancola Construction Corporation (GC) to perform maintenance, repair, and renovation activities on the property. GC renovated the existing buildings in 1989 for the purpose of leasing space to multiple tenants.*

*On 17 December 1984, a Preliminary Assessment (PA) was conducted by NUS Corporation Field Investigation Team (NUS/FIT) at the Howe property. Howe is located on an 18-acre parcel of land near the center of Rutland. On the property, NUS/FIT observed approximately 20 buildings associated with the inactive plant. The area was restricted by a chain-link/barbed-wire fence. Moon Brook was also observed running through a portion of the property. The property is situated on generally flat terrain with the exception of steep slopes adjacent to Moon Brook. Although the former plant was closed, NUS/FIT observed a watchman at the front gate on Strongs Avenue.*

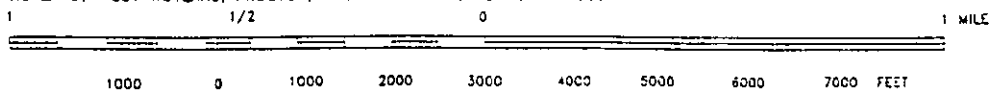
*NUS/FIT noted that 13 monitoring wells and one recovery well were installed by DuBois and King (DK) in 1980. Monitoring wells were placed at locations believed to be downgradient from an alleged solvent disposal area located near MW-4B. According to the Project Manager of GC and Vice President of HCL, Mr. Peter Giancola, this recovery well does not presently exist on site. This disposal area is associated with unspecified cleaning processes using chlorinated organic solvents that occurred in Building No. 16. The recovery well was installed as a response to a No. 6 fuel oil spill that occurred in 1979 from two underground storage tanks (USTs) of unspecified size located north of Building No. 11. Organic contaminants, primarily chlorinated solvents, have been detected consistently in groundwater samples collected from on-site monitoring wells.*

Note: Text which appears in *italics* has been either copied or paraphrased from the NUS Corporation Field Investigation Team Preliminary Assessment.



### LEGEND

BASE MAP IS A PORTION OF THE FOLLOWING 7.5' X 7.5' U.S.G.S. QUADRANGLES:  
RUTLAND, WEST RUTLAND, PROCTOR, AND CHITTENDEN, VERMONT 1980



QUADRANGLE LOCATION



### LOCATION MAP

HOWE RICHARDSON SCALE CO. (FORMER)

1 SCALE AVENUE  
RUTLAND, VERMONT

**WESTON**  
MANAGERS DESIGNERS/CONSULTANTS

REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

FIG NO. 98-05-0035	DRAWN BY: P. PANZA	DATE 6/10/98
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FILE NAME:  
S: 97940015.FIG1.DWG

FIGURE 1



## GENERAL INFORMATION (Continued)

*Additionally, the PA stated that the elevated land north of Moon Brook appeared to be a former landfill area used for the disposal of foundry ash/sand wastes. During a 1980 landfill investigation by DK, heavy metals such as lead, chromium, and zinc were found in groundwater. Wastes generated annually at the Howe facility from various processes are outlined in the following hazardous waste table.*

### 1981 Hazardous Waste for Howe Richardson Scale Co. (former)

Hazardous Waste	Process by Which Generated	Volume (Gallons per Year)
1,1,1-Trichloroethane Sludge	Immersion Degreasing	55
Paint Stripper - 80% Methylene Chloride 15% Formic Acid	Paint Removal	110
Chromic Acid Solution, 3-10% by volume	Post-Plating Chromate Dip	165
Inhibited Hydrochloric Acid Solution, 30% by volume	Pre-Plating Acid Dip	220
Sulfuric Acid Solution, 1% by volume	Pre-Plating Acid Dip	55
Zinc Cyanide Plating Solution & Sludge	Electroplating	275
Nickel Plating Sludge	Nickel Plating	55
Coolants, Cutting Oils	Machining Operations	660
Paint Thinners	Cleaning of Paint Spray Apparatus	660
Paint Filters & Paint Residue	Spray Painting	60
Electro-Plating Wastewater	Electroplating, Chromating	1.25 x 10 <sup>6</sup>
Lubricating & Hydraulic Oils	From Plant Machinery, and Vehicles	2,000
Alkaline Cleaners	Metals Cleaning prior to Painting, Plating and Heat Treatment.	6,000
Iron Phosphate Solution	Pre-Paint Phosphating of Metals	3,000

[24]

Roy F. Weston, Inc., (WESTON®) Superfund Technical Assessment and Response Team (START) personnel were unable to obtain additional information concerning waste listed in the 1981 hazardous waste table. Typically, cutting oils generally contain sulfur and chlorine [30]. Alkaline cleaners are generally composed of sodium hydroxide, carbonic acid, alkali metals (sodium and potassium), and alkali earth metals (calcium) [29; 30].

## GENERAL INFORMATION (Continued)

*The plant was not certified as a hazardous waste treatment or disposal facility, but was permitted for temporary storage for up to 90 days. As of 31 December 1982, a complete cleanup and closure of the site was performed, consisting of the removal of stored wastes, decontamination of plant equipment, and subsequent waste disposal to an unknown location.*

According to a 1986 Environmental Characterization (EC) investigation performed by Fluor Technology, Inc. Environmental Services (FT), following the removal of two No. 6 fuel oil USTs of unspecified sizes in 1980, 35 cubic yards (yd<sup>3</sup>) of contaminated soils were excavated in 1982 and a sump-pump-type oil recovery system was installed [1]. No further information was available to START personnel regarding the excavated contaminated soil. START personnel presume that these USTs are the same ones mentioned by NUS/FIT previously. This soil removal does not meet Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requirements, due to the lack of analytical data following the removal. In October 1985, groundwater samples collected from the discharge pipe of the former recovery well system were analyzed for polychlorinated biphenyls (PCBs), volatile priority pollutants, heavy metals, "general minerals", and cyanide. These results indicated the presence of unspecified concentrations of organic compounds including benzene, ethyl benzene, chlorinated solvents, and total xylenes.

*FT suspected that potential on-site source areas of chlorinated organic solvents included a discharge pipe in the back of Building No. 16, a drain associated with the vapor degreaser formerly operated in the heat treat and plating room (Building No. 6), a chemical storage area beneath the brass room (Building No. 5), and a suspected surface disposal area in the vicinity of MW-4B. No additional information is available to START personnel regarding these potential sources. Additionally, the FT EC stated that personal interviews with former employees suggested that painting equipment was cleaned in the maintenance garage (Building No. 16).*

Subsequently, quarterly groundwater monitoring has been conducted by ATC Environmental, Inc. (ATC) from 1989 to the present. Analytical results reveal that monitoring wells MW-4B, MW-30, MW-31D, MW-32S, MW-36D, MW-36D, and MW-37S continuously contain contaminants such as trichloroethylene, 1,1,1-trichloroethane, 1,1-dichloroethylene, and 1,1-dichloroethane.

On 16 October 1997, START personnel performed an on-site reconnaissance of the Howe property. Building No. 21 (Rutland News) is an automobile repair shop, which contained approximately four 55-gallon metal drums of virgin antifreeze, three 55-gallon drums of virgin automatic transmission fluid, and two 55-gallon metal drums of waste oil. The two waste oil drums were located inside the building on a concrete floor with no nearby floor drains and no signs of leakage [7].

START personnel observed two 275-gallon waste oil aboveground storage tanks (ASTs). One AST was located adjacent to Building No. 12 (Wolfsburg West Auto Service). This AST was situated on the ground without any secondary containment and approximately 10 feet (ft) from a catchbasin. The second AST was located behind Building No. 9 (Dave Nilsen Auto) and was situated on a concrete pad. Adjacent to the second AST on the ground was one empty 55-gallon metal drum, one scrap metal (automobile parts) 55-gallon metal drum, and one empty 55-gallon plastic drum marked "antifreeze". Adjacent to Building No. 17 was one plastic container with

## GENERAL INFORMATION (Continued)

approximately 100 gallons of waste grease/oil from the Howe Restaurant and Coffee Shop. This container was located on a small concrete pad with no signs of leakage [7].

Interstate Manufacturing Company (IMC), located in Building No. 11, machines titanium and aluminum metal. This process generates approximately one 55-gallon drum of waste coolant oil that is emptied annually by Safety Kleen Corporation. IMC had two machines that were situated inside a secondary containment apparatus. The apparatus consisted of a metal drain pan to prevent small amounts of leakage. Additionally, there were no drains in the concrete floor [7].

Hank's Auto Repair (Hank's), located in Building No. 16, contained two 55-gallon metal drums of antifreeze and one 55-gallon metal drum of waste oil. These drums were stored inside the building on a concrete floor and with no signs of leakage. Located in the center of the building, under the only car lift, was a floor drain. START presumes this drain redirects flow to a flush effluent pipe located in the rear (west) of Building No. 16. START personnel also presume that this effluent pipe is the discharge pipe mentioned in the FTEC. START personnel estimated that 8 square feet (ft<sup>2</sup>) of black, discolored soil was located near the effluent pipe [15]. A photoionization detector (PID) reading of 93 units above background levels within the first inch of soil was noted [7]. The depth of contaminated soil is unknown. There was stressed vegetation located near and adjacent to the stained soil [7].

According to the Project Manager of GC and Vice President of HCL, Mr. Peter Giancola, following the START on-site reconnaissance, Hank's Auto Repair closed and Building No. 16 was leased to another automobile repair shop [43]. Mr. Giancola also stated that the floor drain and outlet (effluent) pipe were closed in place using cement grout. Mr. Giancola stated that regarding the floor drain "we will be contacting Mr. Charles Schwer of VT DEC regarding the stained area identified in the Draft SI report. We anticipate that we will work with VT DEC to remove soil in the stained area. It is likely that the soils will be poly-encapsulated on site in a secure area. The removal of these soils will be documented and reported to VT DEC" [43].

START personnel observed three 55-gallon drums adjacent to Building No. 9 inside an outdoor storage area for Newton Precast, Inc. The drums were approximately 100 feet south-southwest of Building No. 9. There was one empty metal drum, one metal drum labeled "surface consolidating agent", and one plastic drum presumed to contain sanding belt grit. No PID readings were noted near these drums. Near the three 55-gallon drums was a surface impoundment, which was approximately 15 feet wide by 30 feet long and used for disposal of daily concrete-derived wastewater. Piles of concrete approximately 1 foot high formed the walls of the surface impoundment, which extended to a depth of approximately 2 feet below the ground surface. During the on-site reconnaissance, START personnel observed and photodocumented an employee of Newton Precast, Inc. disposing of approximately 50 gallons of concrete-derived wastewater to this surface impoundment. No PID readings were noted within this surface impoundment [7].

Building No. 22 was surrounded on two sides (south and west) by scrap metal piles. Included with this scrap metal was one rusted tank. START personnel were informed by Mr. Peter



## GENERAL INFORMATION (Continued)

Giancola, that this tank was a former water boiler tank. No PID readings were noted with this tank [7].

The southern portion of the Howe property was littered with slag debris. Discolored soil, stressed vegetation, or no vegetation were observed on the southwestern portion of the property. There was no PID reading associated with the discolored soil near MW-7B. Similarly stained soils were located on the slope between Moon Brook and MW-37S. According to Mr. Peter Giancola, the discolored soil (burnt sand) and slag are part of the former landfill [7].

START personnel were unable to uncover a drain located in Building No. 6 (White Rocks Printing). Mr. Joseph Giancola, owner of GC, presumes this drain was associated with the drain for the vapor degreaser mentioned by the FT EC. Mr. Joseph Giancola also stated that (an unspecified number of) other drains in this building were removed by tenants during renovations.

There was no evidence of the former chemical storage area, located in the basement of Building No. 5, as mentioned by the FT EC. Green Mountain Bottle Recycling Redemption currently occupies this location to provide storage for bottles and cans. Containment features for this former designated chemical storage area include concrete floors and concrete walls. START observed that the concrete floor was in good condition with no cracks, floor drains, or staining noted.

Six of the 16 monitoring wells located on the Howe property were opened. START personnel obtained a PID reading of 2.1 units above background levels from MW-32S. No other PID readings were recorded from the remaining five monitoring wells.

During the START on-site reconnaissance, the businesses within the Howe complex were toured. The businesses were characterized as retail, office-related, restaurant, and small commercial businesses. No other source areas were noted except for those described above. Several of the businesses were noted to maintain various quantities of products such as household cleaners, paints, roofing tar, and haircare products. Automotive oils, fluids, and cleaning agents were observed to be stored and used as part of automobile repair businesses located on the property. These materials were observed by START personnel to be properly maintained within the respective businesses and were not evaluated as part of this assessment. Table 1 provides a list of the tenants occupying the facility during the on-site reconnaissance and a brief description of START observations.

## GENERAL INFORMATION (Continued)

### Tenants Located on the Howe Richardson Scale Co. (former) Property

Building No.	Tenant	Description
2	Atomic Pro Audio Productions	Offices
2	Carpet Warehouse, Inc.	Carpet Storage
3	Awesome Graphics	Graphics Design Studio
3	Castleton State College	Classrooms/Offices
3	The Franklin Conference Center	Conference Rooms
3	Howe Center Hair Trends Ltd.	Hair Dresser
3	Howe Restaurant & Coffee Shop	Restaurant/Coffee Shop
3	Jones, Candy - Massage Therapy	Offices
3	Merkel Associates	Classrooms/Offices
3	Omega Electric Construction Co., Inc.	Offices
3	Rutland City Schools	Classrooms/Offices
3	State of Vermont, Dept. Human Services	Offices
3	UVM Extension System	Offices
3	Home Security Office/Attic Storage	Storage
4	None	Vacant
5	Green Mountain Bottle Recycling Redemption	Bottle Storage
6	A Stitch in Time	Sewing Shop
6	Lucent Technologies	Offices
6	Miss Jackie's School of Dance	Dance Floor/Offices
6	White Rocks Printing	Offices
6	Vermont Psychiatry Survivors, Inc.	Offices
7*	None	Vacant
8	North American Van Lines	Storage/Warehouse
9	Nilsen, David Auto, Inc.	Automobile Repair
10	Howe Outlet Warehouse Grocery	Grocery Store
10	None (Third Floor)	Storage
11	Berkshire Armored Car	Offices/Garage
11	Interstate Mfg. Co.	Machine Shop

## GENERAL INFORMATION (Concluded)

### Tenants Located on the Howe Richardson Scale Co. (former) Property (Concluded)

Building No.	Tenant	Description
11	Newton Precast, Inc. DBA The Stop Shop	Cement Casters
11	Phillips, Roderick K.	Bakery
11	Jerry LeBlonde Photiques	Offices
11	Rutland Plywood Corporation	Storage/Warehouse
12	Hart, J&J - Wolfsburg West Auto Service (Northeast corner of the building)	Automobile Repair/Parts
12	None (remainder of the building)	Vacant
13	Vermont Candy Wreaths, Inc.	Wreath Production
13	Basement of Vermont Candy Wreaths	Storage
14	Southwestern Vermont Council on Aging	Offices
14	Vermont Associates for Training & Development	Offices
15	Al Melanson Co., Inc.	Offices
15	R & D Machinery, Inc.	Unknown
16*	Hank's Auto Repair	Automobile Repair
17	Booth Dental Labs, Inc.	Produce False Teeth
18	Aronson & Olson, Inc. Surveyors	Offices
18	Day Associates, Inc.	Offices
18	Network Services Corp.	Offices
18	Progressive Design, Inc.	Offices
18	Community Access Program of Rutland County	Offices
19	None	Vacant
20	None	Vacant
21	Rutland News Company	Automobile Repair
22	None	Storage Warehouse (GC)

[5; 7]

\* = Indicates the following changes that occurred after the START on-site reconnaissance: Building No. 16 is occupied by Mighty Muffler (Automobile Repair) and Building No. 7 by Fastenal, (Retail/Wholesale Sales).

## SOURCE EVALUATION

**Description of each Source:** Identify each source area by name and number, and classify each source into a source type category (see SI Table 1). Describe the dimensions of each source. Identify the hazardous substances associated with each source. Determine the containment characteristics for each source by pathway (see HRS Tables 3-2, 4-2, 6-3 and 6-9).

### 1. Effluent Pipe (Other)

*FT suspected that potential on-site source areas of chlorinated organic solvents included a discharge pipe in the back of Building No. 16. Additionally, the FT EC stated that personal interviews with former employees suggested that painting equipment was cleaned in the maintenance garage (Building No. 16).*

START personnel observed a floor drain, located under a car lift, in Building No. 16. START personnel presume that this drain redirects flow to a flush effluent pipe located in the rear (west) of Building No. 16. START personnel also presume that this effluent pipe is the discharge pipe mentioned in the FT EC. For the purpose of this investigation, this source will be evaluated as available to all pathways.

### 2. Contaminated Soil (Contaminated Soil)

Approximately 8 ft<sup>2</sup> of black, discolored soil was located near the effluent pipe [15]. Groundwater levels in the vicinity (at monitoring well PZ-1B) of the effluent pipe average 6 feet below ground surface. The volume of contaminated soil is estimated at 48 cubic feet (ft<sup>3</sup>), presuming the contaminated soil extends to the groundwater level [6; 15]. There was a PID reading of 93 units above background levels within the first inch of soil [7]. Stressed vegetation was noted near and adjacent to the stained soil. For the purpose of this investigation, this source will be evaluated as available to all pathways.

### 3. Landfill (Landfill)

*The PA stated that the elevated land north of Moon Brook appeared to be a former landfill area for disposal of foundry ash/sand wastes. START personnel observed that the southern portion of the property was littered with slag debris. Discolored soil and stressed vegetation were located on the southwestern portion of the property. Similarly stained soils were located on the slope between Moon Brook and MW-37S. According to Mr. Peter Giancola, the discolored soil (burnt sand) and slag are part of the former landfill. No PID readings were associated with the discolored soil near MW-7B.*

Assuming the southern portion of the property to be the former landfill, START personnel estimated an area of 403,137 ft<sup>2</sup> [17]. Utilizing a structure contour map of landfill/native soil contact sketch by FT, depth of landfill material averages 11.5 ft, resulting in a volume of 4,636,076 ft<sup>3</sup>. In addition, based on available file information, there exists a disposal area south of Building No. 16 and adjacent to the landfill. These sources will be evaluated as one potential source available to all pathways.

## SOURCE EVALUATION (Continued)

### 4. Drums (Drums)

START personnel observed three 55-gallon drums adjacent to Building No. 9 inside an outdoor storage area for Newton Precast, Inc. The drums were approximately 100 feet south-southwest of Building No. 9. There was one empty metal drum, one metal drum labeled "surface consolidating agent", and one plastic drum presumed to contain sanding belt grit. For the purpose of this investigation, two 55-gallon drums will be evaluated as available to all pathways.

### 5. Aboveground Storage Tank (Tank)

A 275-gallon waste oil AST was located adjacent to Building No. 12 (Wolfsburg West Auto Service). This AST was situated on the ground without any secondary containment and approximately 10 feet from a catchbasin. For the purpose of this investigation, this source will be evaluated as available to all pathways.

### 6. Aboveground Storage Tank (Tank)

Another 275-gallon waste oil AST was located behind Building No. 9 (Dave Nilsen Auto) and situated on a concrete pad. For the purpose of this investigation, this source will be evaluated as available to all pathways.

### 7. Non-Drum Container (Non-Drum Container)

One plastic container containing approximately 100 gallons of waste grease/oil from the Howe Restaurant and Coffee Shop was located adjacent to Building No. 17. For the purpose of this investigation, this source will be evaluated as available to all pathways.

### 8. Surface Impoundment (Surface Impoundment)

A lagoon approximately 15 feet wide by 30 feet long was located near Building No. 9. During the on-site reconnaissance, an employee of Newton Precast, Inc. disposed of approximately 50 gallons of concrete-derived wastewater to this surface impoundment. For the purpose of this investigation, this source will be evaluated as available to all pathways.

### 9. Contaminated Soil (Contaminated Soil)

According to a 1986 EC investigation performed by FT, following the removal of two No. 6 fuel oil USTs of unspecified sizes in 1980, 35 yd<sup>3</sup> of contaminated soils were excavated in 1982 and a sump-pump-type oil recovery system was installed [1]. No further information is available regarding the excavated contaminated soil. START personnel presume that these USTs are the ones mentioned by NUS/FIT previously. This soil removal does not meet CERCLA requirements, due to the lack of analytical data following the removal. For the purpose of this evaluation, since this area is located beneath asphalt, this contaminated soil is only available to the groundwater and surface water pathways.

## SOURCE EVALUATION (Continued)

### 10. Drums (Drums)

Building No. 21 (Rutland News) is an automobile repair shop, which contained approximately four 55-gallon metal drums of virgin antifreeze, three 55-gallon drums of virgin automatic transmission fluid, and two 55-gallon metal drums of waste oil. These drums are located inside the building on a concrete floor with no nearby floor drains and no signs of leakage. For the purpose of this evaluation, only the two waste oil drums will be evaluated and are available to the air pathway only.

### 11. Drums (Drums)

Hank's, located in Building No. 16, contained two 55-gallon metal drums of antifreeze and one 55-gallon metal drum of waste oil. These drums were stored inside the building on a concrete floor and with no signs of leakage. For the purpose of this investigation, only one 55-gallon waste oil drum will be evaluated as available to the air pathway.

### 12. Drums (Drums)

IMC, located in Building No. 11, machines titanium and aluminum metal. This process generates approximately one 55-gallon drum of waste coolant oil that is emptied annually by Safety Kleen Corporation. There were no drains in the concrete floor. For the purpose of this investigation, this 55-gallon drum will be evaluated as only available to the air pathway.

### 13. Drain (Other)

Due to carpeting, START personnel were unable to assess the condition of the Building No. 6 floor drain (White Rocks Printing). Mr. Joseph Giancola presumes this drain to be associated with the drain for the vapor degreaser mentioned by the FT EC. Mr. Joseph Giancola also stated that (an unspecified number of) other drains in this building were removed by tenants. For the purpose of this investigation, this source will no longer be evaluated.

### 14. Chemical Storage Area (Non-Drum Containers)

There was no evidence of the former chemical storage area, located in the basement of Building No. 5, mentioned by the FT EC. Green Mountain Bottle Recycling Redemption currently resides at this location to provide storage for bottles and cans. Containment features for this former designated chemical storage area include concrete floors and concrete walls. START observed that the concrete floor was in good condition with no cracks, floor drains, or staining noted. For the purpose of this investigation, this source will not be evaluated.

## SOURCE EVALUATION (Continued)

### 15. USTs (Tanks)

According to the FT EC, following the removal of two USTs (1980) known to have leaked No. 6 fuel oil, contaminated soils were excavated and a sump-pump-type oil recovery system was installed. Fuel oil is ineligible under CERCLA investigations; this source will not be further evaluated.

Source No.	Source Type	Pathway Availability			
		GW	SW	SE	A
1	Other (effluent pipe)	Y	Y	Y	Y
2	Contaminated Soil	Y	Y	Y	Y
3	Landfill	Y	Y	Y	Y
4	Drums	Y	Y	Y	Y
5	Tank	Y	Y	Y	Y
6	Tank	Y	Y	Y	Y
7	Non-Drum Container	Y	Y	Y	Y
8	Surface Impoundment	Y	Y	Y	Y
9	Contaminated Soil	Y	Y	N	N
10	Drums	N	N	N	Y
11	Drums	N	N	N	Y
12	Drums	N	N	N	Y
13	Other	N	N	N	N
14	Non-Drum Containers	N	N	N	N
15	Tanks	I	I	I	I

Legend: Y = available to pathway  
 N = not available to pathway  
 ? = availability unknown  
 I = ineligible waste

## SOURCE EVALUATION (Continued)

None of the sources had sufficient information to evaluate on *Tier A (Hazardous Constituent Quantity)* or *Tier B (Hazardous Wastestream Quantity)*.

### 1. Effluent Pipe (Other)

#### *Tier C (Volume)*

START assumes the distance between the floor drain and end of the effluent pipe is approximately 15 feet [7]. Assuming a diameter of 4 inches, START personnel estimated the effluent pipe has a volume of 1.3 cubic feet [31]. For multiple source properties, the total volume (in ft<sup>3</sup>) is divided by 67.5.

$$1.3 \text{ ft}^3 \div 67.5 = 0.019$$

#### *Tier D (Area)*

This source cannot be evaluated on this tier.

$$\text{Source 1 WQ} = 0.019$$

### 2. Contaminated Soil (Contaminated Soil)

#### *Tier C (Volume)*

Groundwater in the vicinity (PZ-1B) of the contaminated soil averages 6 feet. Presuming the contaminated soil (approximately 8 ft<sup>3</sup>) extends to the groundwater level, then the volume of contaminated soil is estimated at 48 ft<sup>3</sup>. For multiple source properties, the total volume (in ft<sup>3</sup>) is divided by 67,500.

$$48 \text{ ft}^3 \div 67,500 = 0.0007$$

#### *Tier D (Area)*

Approximately 8 ft<sup>2</sup> of discolored soil is located adjacent to an effluent pipe on the west side of Building No. 16. For multiple source properties, the total area for contaminated soil (in ft<sup>2</sup>) is divided by 34,000.

$$8 \text{ ft}^2 \div 34,000 = 0.0002$$

$$\text{Source 2 WQ} = 0.0007$$



## SOURCE EVALUATION (Continued)

### 3. Landfill (Landfill)

#### *Tier C (Volume)*

An estimated 4,636,076 ft<sup>3</sup> of landfill material is located on the southern portion of the property. For multiple source properties, the total volume for the landfill (in ft<sup>3</sup>) is divided by 67,500.

$$4,636,076 \text{ ft}^3 \div 67,500 = 68.68$$

#### *Tier D (Area)*

The landfill covers an area of approximately 403,137 ft<sup>2</sup>. For multiple source properties, the total area (in ft<sup>2</sup>) for the landfill is divided by 3,400.

$$403,137 \text{ ft}^2 \div 3,400 = 118.57$$

Source 3 WQ = 118.57

### 4. Drums (Drums)

#### *Tier C (Volume)*

There are two 55-gallon drums located approximately 100 feet southwest of Building No. 9. For multiple source properties, the total number of drums is divided by 10.

$$2 \text{ drums} \div 10 = 0.2$$

#### *Tier D (Area)*

This source cannot be evaluated on this tier.

Source 4 WQ = 0.2

### 5. Aboveground Storage Tank (Tank)

#### *Tier C (Volume)*

A 275-gallon waste oil AST was located adjacent to Building No. 12 (Wolfsburg West Auto Service). For multiple source properties, the total volume of the tank in gallons is divided by 500.

$$275 \text{ gallons} \div 500 = 0.55$$

## SOURCE EVALUATION (Continued)

### Tier D (Area)

This source cannot be evaluated on this tier.

$$\text{Source 5 WQ} = 0.55$$

### 6. Aboveground Storage Tank (Tank)

#### Tier C (Volume)

Another 275-gallon waste oil AST was located behind Building No. 9. For multiple source properties, the total volume of the tank in gallons is divided by 500.

$$275 \text{ gallons} \div 500 = 0.55$$

### Tier D (Area)

This source cannot be evaluated on this tier.

$$\text{Source 6 WQ} = 0.55$$

### 7. Non-Drum Container (Non-Drum Container)

#### Tier C (Volume)

A 100-gallon container of waste grease/oil was located near Building No. 17. For multiple source properties, the total volume of the container in gallons is divided by 500.

$$100 \text{ gallons} \div 500 = 0.2$$

### Tier D (Area)

This source cannot be evaluated on this tier.

$$\text{Source 7 WQ} = 0.2$$

### 8. Surface Impoundment (Surface Impoundment)

#### Tier C (Volume)

A lagoon surrounded with concrete located near Building No. 9 consists of approximately (15 ft  $\times$  30 ft  $\times$  2 ft) 900 ft<sup>3</sup> of liquid. For multiple source properties, the total volume for the surface impoundment is divided by 67.5.

$$900 \text{ ft}^3 \div 67.5 = 13.33$$

## SOURCE EVALUATION (Continued)

### *Tier D (Area)*

The lagoon covers an area of approximately 450 ft<sup>2</sup>. For multiple source properties, the total area (in ft<sup>2</sup>) for the surface impoundment is divided by 13.

$$450 \text{ ft}^2 \div 13 = 34.62$$

Source 8 WQ = 34.62

### 9. Contaminated Soil (Contaminated Soil)

#### *Tier C (Volume)*

Thirty-five yd<sup>3</sup> of contaminated soils were excavated in 1982 as a response to leakage from two No. 6 fuel oil USTs. For multiple source properties, the total volume for the contaminated soil (in yd<sup>3</sup>) is divided by 2,500.

$$35 \text{ yd}^3 \div 2,500 = 0.014$$

#### *Tier D (Area)*

Insufficient information is available to evaluate the source on this tier.

Source 9 WQ = 0.014

### 10. Drums (Drums)

#### *Tier C (Volume)*

There are two 55-gallon waste oil drums located in Building No. 21. For multiple source properties, the total number of drums is divided by 10.

$$2 \text{ drums} \div 10 = 0.2$$

#### *Tier D (Area)*

This source cannot be evaluated on this tier.

Source 10 WQ = 0.2

## SOURCE EVALUATION (Continued)

### 11. Drums (Drums)

#### *Tier C* (Volume)

There is one 55-gallon drum located in Building No. 16. For multiple source properties, the total number of drums is divided by 10.

$$1 \text{ drums} \div 10 = 0.1$$

#### *Tier D* (Area)

This source cannot be evaluated on this tier.

**Source 11 WQ = 0.1**

### 12. Drums (Drums)

#### *Tier C* (Volume)

There is one 55-gallon drum located in Building No. 11. For multiple source properties, the total number of drums is divided by 10.

$$1 \text{ drums} \div 10 = 0.1$$

#### *Tier D* (Area)

This source cannot be evaluated on this tier.

**Source 12 WQ = 0.1**

Sources 13 through 15 are ineligible or not available to any pathways. For the following pathways, sources 1 through 9 have a site waste quantity total of  $(0.019 + 0.0007 + 118.57 + 0.2 + 0.55 + 0.55 + 0.2 + 34.62 + 0.014) = 154.7$ . From SI Table 2, a site WQ total between 100 and 10,000 is assigned an Hazardous Wastestream Quantity (HWQ) of 100. These sources are available to the groundwater and surface water pathways.

**GW HWQ = 100**  
**SW HWQ = 100**

### SOURCE EVALUATION (Concluded)

For the following pathway, sources 1 through 8 have a site waste quantity total of  $(0.019 + 0.0007 + 118.57 + 0.2 + 0.55 + 0.55 + 0.2 + 34.62) = 154.7$ . From SI Table 2, a site WQ total between 100 and 10,000 is assigned an HWQ of 100. These sources are available to the soil exposure pathway.

SE HWQ = 100

For the following pathway, sources 1 through 8 and 10 through 12 have a site waste quantity total of  $(0.019 + 0.0007 + 118.57 + 0.2 + 0.55 + 0.55 + 0.2 + 34.62 + 0.2 + 0.1 + 0.1) = 155.1$ . From SI Table 2, a site WQ total between 100 and 10,000 is assigned an HWQ of 100. These sources are available to the air pathway.

AIR HWQ = 100

Notes: If sources 1, 2, and 11 associated with Building No. 46 were not evaluated, this would result in a decrease in WQ score of 0.0197 for the groundwater, surface water, and soil exposure pathways. The WQ score for the Air pathway would decrease by 0.1197. These results will not change the HWQ score of 100.

**SI TABLE 1: HAZARDOUS WASTE QUANTITY (HWQ) SCORES FOR SINGLE SOURCE SITES AND FORMULAS FOR MULTIPLE SOURCE SITES**

Tier	Source Type	Single Source Sites (assigned HWQ scores)				Multiple Source Sites
		HWQ = 10	HWQ = 100	HWQ = 10,000	HWQ = 1,000,000	Divisors for Assigning Source WQ Values
<b>A Hazardous Constituent Quantity</b>	N/A	HWQ = 1 if Hazardous Constituent Quantity data are complete  HWQ = 10 if Hazardous Constituent Quantity data are not complete	> 100 to 10,000 lbs	> 10,000 to 1 million lbs	> 1 million lbs	lbs ÷ 1
<b>B Hazardous Wastestream Quantity</b>	N/A	≤ 500,000 lbs	> 500,000 to 50 million lbs	> 50 million to 5 billion lbs	> 5 billion lbs	lbs ÷ 5,000
<b>C Volume</b>	Landfill	≤ 6.75 million ft <sup>3</sup> ≤ 250,000 yd <sup>3</sup>	> 6.75 million to 675 million ft <sup>3</sup> > 250,000 to 25 million yd <sup>3</sup>	> 675 million to 67.5 billion ft <sup>3</sup> > 25 million to 2.5 billion yd <sup>3</sup>	> 67.5 billion ft <sup>3</sup> > 2.5 billion yd <sup>3</sup>	ft <sup>3</sup> ÷ 67,500 yd <sup>3</sup> ÷ 2,500
	Surface impoundment	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 to 67.5 million ft <sup>3</sup> > 25,000 to 2.5 million yd <sup>3</sup>	> 67.5 million ft <sup>3</sup> > 2.5 million yd <sup>3</sup>	ft <sup>3</sup> ÷ 67.5 yd <sup>3</sup> ÷ 2.5
	Drums	≤ 1,000 drums	> 1,000 to 100,000 drums	> 100,000 to 10 million drums	> 10 million drums	drums ÷ 10
	Tanks and non-drum containers	≤ 50,000 gallons	> 50,000 to 5 million gallons	> 5 million to 500 million gallons	> 500 million gals.	gallons ÷ 500
	Contaminated soil	≤ 6.75 million ft <sup>3</sup> ≤ 250,000 yd <sup>3</sup>	> 6.75 million to 675 million ft <sup>3</sup> > 250,000 to 25 million yd <sup>3</sup>	> 675 million to 67.5 billion ft <sup>3</sup> > 25 million to 2.5 billion yd <sup>3</sup>	> 67.5 billion ft <sup>3</sup> > 2.5 billion yd <sup>3</sup>	ft <sup>3</sup> ÷ 67,500 yd <sup>3</sup> ÷ 2,500
	Pile	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 to 67.5 million ft <sup>3</sup> > 25,000 to 2.5 million yd <sup>3</sup>	> 67.5 million ft <sup>3</sup> > 2.5 million yd <sup>3</sup>	ft <sup>3</sup> ÷ 67.5 yd <sup>3</sup> ÷ 2.5
	Other	≤ 6,750 ft <sup>3</sup> ≤ 250 yd <sup>3</sup>	> 6,750 to 675,000 ft <sup>3</sup> > 250 to 25,000 yd <sup>3</sup>	> 675,000 to 67.5 million ft <sup>3</sup> > 25,000 to 2.5 million yd <sup>3</sup>	> 67.5 million ft <sup>3</sup> > 2.5 million yd <sup>3</sup>	ft <sup>3</sup> ÷ 67.5 yd <sup>3</sup> ÷ 2.5

**SI TABLE 1: HAZARDOUS WASTE QUANTITY (HWQ) SCORES FOR SINGLE SOURCE SITES AND FORMULAS FOR MULTIPLE SOURCE SITES**

Tier	Source Type	Single Source Sites (assigned HWQ scores)				Multiple Source Sites
		HWQ = 10	HWQ = 100	HWQ = 10,000	HWQ = 1,000,000	Divisors for Assigning Source WQ Values
D Area	Landfill	≤ 340,000 ft <sup>2</sup> ≤ 7.8 acres	> 340,000 to 34 million ft <sup>2</sup> > 7.8 to 780 acres	> 34 million to 3.4 bil. ft <sup>2</sup> > 780 to 78,000 acres	> 3.4 billion ft <sup>2</sup> > 78,000 acres	ft <sup>2</sup> ÷ 3,400 acres ÷ 0.078
	Surface Impoundment	≤ 1,300 ft <sup>2</sup> ≤ 0.029 acres	> 1,300 to 130,000 ft <sup>2</sup> > 0.029 to 2.9 acres	> 130,000 to 13 million ft <sup>2</sup> > 2.9 to 290 acres	> 13 million ft <sup>2</sup> > 290 acres	ft <sup>2</sup> ÷ 13 acres ÷ 0.00029
	Contaminated Soil	≤ 3.4 million ft <sup>2</sup> ≤ 78 acres	> 3.4 million to 340 million ft <sup>2</sup> > 78 to 7,800 acres	> 340 million to 34 bil. ft <sup>2</sup> > 7,800 to 780,000 acres	> 34 billion ft <sup>2</sup> > 780,000 acres	ft <sup>2</sup> ÷ 34,000 acres ÷ 0.78
	Pile	≤ 1,300 ft <sup>2</sup> ≤ 0.029 acres	> 1,300 to 130,000 ft <sup>2</sup> > 0.029 to 2.9 acres	> 130,000 to 13 million ft <sup>2</sup> > 2.9 to 290 acres	> 13 million ft <sup>2</sup> > 290 acres	ft <sup>2</sup> ÷ 13 acres ÷ 0.00029
	Land treatment	≤ 27,000 ft <sup>2</sup> ≤ 0.62 acres	> 27,000 to 2.7 million ft <sup>2</sup> > 0.62 to 62 acres	> 2.7 mil. to 270 million ft <sup>2</sup> > 62 to 6,200 acres	> 270 million ft <sup>2</sup> > 6,200 acres	ft <sup>2</sup> ÷ 270 acres ÷ 0.0062

1 ton = 2,000 lbs = 1 yd<sup>3</sup> = 4 drums = 200 gallons

**SI TABLE 2: HWQ SCORES FOR MULTIPLE SOURCE SITES**

Site WQ Total	HWQ Score
0	0
1 <sup>a</sup> to 100	1 <sup>b</sup>
> 100 to 10,000	100
> 10,000 to 1,000,000	10,000
> 1,000,000	1,000,000

<sup>a</sup>If the HWQ total is between 0 and 1, round it to 1.

<sup>b</sup>If the hazardous constituent quantity data are not complete, assign the score of 10.

### SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET

Enter "NA" for substances which are not available to a pathway.  
 Enter "NL" for substances values not listed in SCDM.  
 Enter "-" for values not calculated due to substances values not listed in SCDM.  
 Provide footnote for substances listed in table but not used for scoring purposes  
 (e.g. BTEX substances attributable to a gasoline tank.)

Sources:  
 1. Other  
 4. Drums  
 7. Non-Drum Container  
 10. Drums

2. Contaminated Soil  
 5. Tank  
 8. Surface Impoundment  
 11. Drums

3. Landfill  
 6. Tank  
 9. Drums  
 12. Drums

Source	Hazardous Substance	Toxicity	GROUNDWATER PATHWAY					SURFACE WATER PATHWAY				
			GW Mobility (HRS Table 2-8)	Tox. x Mobility Value (HRS Table 3-9)	Pers. (HRS Tables 4-10 and 4-11)	Tox. x Pers. Value (HRS Table 4-12)	Bioacc. Pot. (HRS Table 4-15)	OVERLAND/FLOOD MIGRATION				
								Tox. x Pers. x Bioacc. Value (HRS Table 4-16)	Ecotox. (HRS Table 4-19)	Ecotox. x Pers. (HRS Table 4-20)	Eco. Bioacc. Pot. (HRS Table 4-20)	Ecotox. x Pers. x Eco. Bioacc. Value (HRS 4-21)
1,2,3,5,6,7,9,10,11	Acetone	10	1	10	0.4	4	0.5	2	100	40	0.5	20
1,2,3,5,6,7,9,10,11	Benzene	100	1	100	0.4	40	5,000	2E+05	100	40	500	20,000
1,2,3	Calcium	NL	1	--	1	--	500	--	NL	--	500	--
1,2,3	Carbon tetrachloride	1,000	1	1,000	0.4	400	10	20,000	100	40	50	2,000
1,2,3	Chloroethane	1	1	1	0.0007	0.0007	5	0.0035	NL	--	5	--
1,2,3,4,5,6,7,9,10,11	Chromium	10,000	0.01	100	--	10,000	5	50,000	100	100	5	500
1,2,3	Cyanide	100	1	100	0.4	40	0.5	20	1,000	400	0.5	200
1,2,3	Dichlorobenzene, 1,2-	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3,5,6,7,9,10,11	Dichlorobenzene, 1,3-	NL	1	--	0.4	--	50	--	100	40	50	2,000
1,2,3	Dichlorobenzene, 1,4-	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3,5,6,7,9,10,11	Dichloroethane, 1,1-	10	1	10	0.4	4	5	20	NL	--	5	--
1,2,3	Dichloroethane, 1,2-	100	1	100	0.4	40	5	200	1	0.4	5	2
1,2,3	Dichloroethylene, 1,1-	100	1	100	0.4	40	50	2,000	10	4	50	200
1,2,3,5,6,7,9,10,11	Dichloroethylene, trans-1,2-	100	1	100	0.4	40	50	2,000	1	0.4	50	20
1,2,3,5,6,7,9,10,11	Ethylbenzene	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3	Formic acid	1	1	1	1	1	0.5	0.5	10	10	0.5	5
1,2,3	Hydrochloric acid	100	1	100	0.4	40	0.5	20	1	0.4	0.5	0.2
1,2,3	Iron	1	0.01	0.01	1	1	0.5	0.5	10	10	0.5	5
1,2,3,4,5,6,7,9,10,11	Lead	10,000	0.01	100	1	10,000	50	5E+05	1,000	1,000	5,000	5E+06
1,2,3	Methylene chloride	10	1	10	0.4	4	5	20	1	0.4	5	2
1,2,3	Nickel	10,000	0.01	100	1	10,000	0.5	5,000	10	10	500	5,000
1,2,3	Potassium	NL	1	--	1	--	0.5	--	NL	--	0.5	--
1,2,3	Sodium	NL	0.01	--	1	--	0.5	--	NL	--	0.5	--



### SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET

Enter "NA" for substances which are not available to a pathway.  
 Enter "NL" for substances values not listed in SCDM.  
 Enter "-" for values not calculated due to substances values not listed in SCDM.  
 Provide footnote for substances listed in table but not used for scoring purposes  
 (e.g. ITEX substances attributable to a gasoline tank.)

Sources:  
 1. Other  
 4. Drums  
 7. Non-Drum Container  
 10. Drums

2. Contaminated Soil  
 5. Tank  
 8. Surface Impoundment  
 11. Drums

3. Landfill  
 6. Tank  
 9. Drums  
 12. Drums

			GROUNDWATER PATHWAY				SURFACE WATER PATHWAY					
			OVERLAND/FLOOD MIGRATION									
Source	Hazardous Substance	Toxicity	GW Mobility (HRS Table 3-8)	Tox. x Mobility Value (HRS Table 3-9)	Pers. (HRS Tables 4-10 and 4-11)	Tox. x Pers. Value (HRS Table 4-12)	Bioacc. Pot. (HRS Table 4-15)	Tox. x Pers. x Bioacc. Value (HRS Table 4-16)	Ecotox. (HRS Table 4-19)	Ecotox. x Pers. (HRS Table 4-20)	Eco. Bioacc. Pot. (HRS Table 4-20)	Ecotox. x Pers. x Eco. Bioacc. Value (HRS Table 4-21)
1,2,3	Sulfuric acid	1,000	1	1,000	0.4	400	0.5	200	10	4	0.5	2
1,2,3,5,6,7,9,10,11	Trichloroethane, 1,1,1-	1	1	1	0.4	0.4	5	2	10	4	5	20
1,2,3,4,5,6,7,9,10,11	Trichloroethane, 1,1,2-	1,000	1	1,000	0.4	400	50	20,000	10	4	50	200
1,2,3,5,6,7,9,10,11	Trichloroethylene	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3,5,6,7,9,10,11	Xylene, p- (also use for total)	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3	Zinc	10	0.01	0.1	0.4	10	500	5,000	10	10	500	5,000

SCDM Version: JUN96

NOTES: Methyl-tert-butyl-ether, phosphate, sodium hydroxide, lubricating oil, hydraulic oil, chlorine, sulfur and carbon acid not listed in SCDM.

SI Table 3 assumptions: liquid-phase waste disposed of in non-karst terrane, fresh-water river environment values.

BE-05 = Particulate Mobility Factor Value Based on IIRS Figure 6-3.

Compounds contained in Source No. 12 (non-contact waste coolant) utilized in Building No. 11 are unknown.

Chemical info: Dichloroethylene, 1,1- = Vinylidene chloride

Methyl chloroform = Trichloroethane, 1,1,1-

Chloroethane = Ethylchloride

Dichlorobenzene, o- = Dichlorobenzene, 1,2-

# SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET

(Continued)

Sources:  
 4. Other  
 5. Drums  
 7. Non-Drum Container  
 10. Drums

2. Contaminated Soil  
 5. Tank  
 8. Surface Impoundment  
 11. Drums

3. Landfill  
 6. Tank  
 9. Drums  
 12. Drums

Source	Hazardous Substance	Toxicity	GROUNDWATER TO SURFACE WATER				AIR PATHWAY		
			Tox. x Mob. x Pers. Value (HRS Table 4-26)	Tox. x Mob. x Pers. x Bioacc. Value (HRS Table 4-28)	Ecotox. x Mob. x Pers. Value (HRS Table 4-29)	Ecotox. x Mob. x Pers. x Ecobioacc. Value (HRS Table 4-29)	Gaseous/Particulate (HRS Table 6-13) (indicate G or P)	Mobility (HRS Table 6-11, 6-12)	Tox. x Mob. Value (HRS Table 6-13)
1,2,3,5,6,7,9,10,11	Acetone	10	4	2	40	20	G	1	10
1,2,3,5,6,7,9,10,11	Benzene	100	40	2E+03	40	20,000	G	1	100
1,2,3	Calcium	NL	--	--	--	--	P	8E-05	--
1,2,3	Carbon tetrachloride	1,000	400	20,000	40	2,000	G	1	1,000
1,2,3	Chloroethane	1	0.0007	0.0035	--	--	G	1	1
1,2,3,4,5,6,7,9,10,11	Chromium	10,000	100	500	1	5	P	--	--
1,2,3	Cyanide	100	40	20	400	200	P	8E-05	0.008
1,2,3	Dichlorobenzene, 1,2-	10	4	200	40	2,000	G	1	10
1,2,3,5,6,7,9,10,11	Dichlorobenzene, 1,3-	NL	--	--	40	2,000	G	1	--
1,2,3	Dichlorobenzene, 1,4-	10	4	200	40	2,000	G	1	10
1,2,3,5,6,7,9,10,11	Dichloroethane, 1,1-	10	4	20	--	--	G	1	10
1,2,3	Dichloroethane, 1,2-	100	40	200	0.4	2	G	1	100
1,2,3	Dichloroethylene, 1,1-	100	40	2,000	4	200	G	1	100
1,2,3,5,6,7,9,10,11	Dichloroethylene, trans-1,2-	100	40	2,000	0.4	20	G	1	100
1,2,3,5,6,7,9,10,11	Ethyl benzene	10	4	200	40	2,000	G	1	10
1,2,3	Formic acid	1	1	0.5	10	5	G	1	1
1,2,3	Hydrochloric acid	100	40	20	0.4	0.2	G	1	100
1,2,3	Iron	1	0.01	0.005	0.1	0.05	P	8E-05	8E-05
1,2,3,4,5,6,7,9,10,11	Lead	10,000	100	5,000	10	50,000	P	8E-05	0.8
1,2,3	Methylene chloride	10	4	20	0.4	2	G	1	10
1,2,3	Nickel	10,000	100	50	0.1	50	P	8E-05	0.5
1,2,3	Potassium	NL	--	--	--	--	P	8E-05	--
1,2,3	Sodium	NL	--	--	--	--	P	8E-05	--

# SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET

(Continued)

## Sources:

1. Other
4. Drums
7. Non-Drum Container
10. Drums

2. Contaminated Soil
5. Tank
8. Surface Impoundment
11. Drums

3. Landfill
6. Tank
9. Drums
12. Drums

Source	Hazardous Substance	Toxicity	SURFACE WATER PATHWAY				AIR PATHWAY		
			GROUNDWATER TO SURFACE WATER				Gaseous/ Particulate (HRS Table 6-13) (indicate G or P)	Mobility (HRS Table 6-11, 6-12)	Tox. x Mob. Value (HRS Table 6-13)
			Tox. x Mob. x Pers. Value (HRS Table 4-26)	Tox. x Mob. x Pers. x Bioacc. Value (HRS Table 4-28)	Ecotox. x Mob. x Pers. Value (HRS Table 4-29)	Ecotox. x Mob. x Pers. x Ecobioacc. Value (HRS Table 4-29)			
1,2,3	Sulfuric acid	1,000	400	200	4	2	G/P	0.02	20
1,2,3,5,6,7,9,10,11	Trichloroethane, 1,1,1-	1	0.4	2	4	20	G	1	1
1,2,3,4,5,6,7,9,10,11	Trichloroethane, 1,1,2-	1,000	400	20,000	4	200	G	1	1,000
1,2,3,5,6,7,9,10,11	Trichloroethylene	10	4	200	40	2,000	G	1	10
1,2,3,5,6,7,9,10,11	Xylene, p- (also use for total)	10	4	200	40	2,000	G	1	10
1,2,3	Zinc	10	0.1	50	0.1	50	P	8E-05	0.0008

SCDM Version: JUN96

NOTES: Methyl-tert-butyl-ether, phosphate, sodium hydroxide, lubricating oil, hydraulic oil, chlorine, sulfur and carbon acid not listed in SCDM.

SI Table 3 assumptions: liquid-phase waste disposed of in non-karst terrane, fresh-water river environment values.

8E-05 = Particulate Mobility Factor Value Based on HRS Figure 6-3.

Compounds contained in Source No. 12 (non-contact waste coolant) utilized in Building No. 11 are unknown.

Chemical info: Dichloroethylene, 1,1- = Vinylidene chloride

Methyl chloroform = Trichloroethane, 1,1,1-

Chloroethane = Ethylchloride

Dichlorobenzene, o- = Dichlorobenzene, 1,2-

## GROUNDWATER PATHWAY

**Pathway Description and Scoring Notes:** Describe the Groundwater Migration Pathway. Include the names and brief descriptions of the aquifers underlying the site, the depth to groundwater, the locations of the nearest private and public drinking water supplies and the aquifers from which they draw, and the population relying upon groundwater drawn from within 4-radial miles of the site for their drinking water supplies.

Briefly discuss any sampling events relative to the Groundwater Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Groundwater Pathway for this site, or any key factors which influence your scoring rationale.

The surficial geology in the vicinity of Rutland, Vermont consists of glacial lacustrine deposits or recent alluvial material [1]. According to seismic data and drilling records by FT, these deposits consist of approximately 100 feet of till material overlain by an average of 67.5 feet of silt and clay. These deposits are covered by lake sand and alluvium [1].

FT excavated three test pits and advanced 16 soil borings during their 1986 EC. Soil borings were advanced to a maximum depth of 40 feet below the ground surface. The maximum depth of the test pits was 18 feet. According to FT, the soil borings and test pits indicate that the Howe property primarily consists of silty clays and clayey silts. The southern portion (landfill) of the property has been filled with slag, cinder, and "miscellaneous plant refuse". Groundwater contour maps prepared by FT indicate that the on-site groundwater flows in a southeasterly direction, toward Moon Brook [1].

Bedrock in the vicinity of the Howe property has been mapped as Cambrian and Ordovician aged metamorphic quartzites, phyllites, schists, and dolomites [1]. No bedrock formation mapped within 4-radial miles of the Howe property is known to exhibit karst characteristics [40].

*NUS/FIT noted that 13 monitoring wells and one recovery well were installed by DK in 1980. Monitoring wells were placed at locations believed to be downgradient from the alleged solvent disposal area. The former recovery well was installed as a response to a No. 6 fuel oil spill. Organic contaminants, primarily chlorinated solvents, have been detected consistently in samples collected from on-site monitoring wells. During a 1980 landfill investigation by DK, heavy metals such as lead, chromium, and zinc were found in groundwater. Additionally, the PA stated that the elevated land north of Moon Brook appeared to be a former landfill area used for the disposal of foundry ash/sand wastes.*

Groundwater measurements range from an average of 2.68 to 19.83 ft at MW-PZ-2B to MW-WC-2S, respectively.

Quarterly groundwater monitoring by ATC across the Howe property from October 1989 to July 1997 revealed the presence of the following compounds in the following monitoring wells at the following maximum concentrations in parts per billion (ppb): chloroethane [MW-4B] (83); carbon tetrachloride [MW-4B] (21); total xylenes [MW-4B] (21.4); lead [MW-35] (28); benzene [PZ-1B] (24); dichlorobenzene [PZ-1B] (3,200); 1,3-dichlorobenzene [PZ-1B] (240); 1,4-dichlorobenzene

## GROUNDWATER PATHWAY (Continued)

[PZ-1B] (114); 1,1,1-trichloroethane [MW-30] (1,300); 1,1-dichloroethane [MW-31D] (1,090); 1,1-dichloroethylene [MW-32S] (1,000); 1,2-dichloroethane [MW-32S] (220); trichloroethylene [MW-36D] (5,800); 1,2-dichloroethylene [MW-37S] (44.9); methylene chloride [WC-1-S] (260). These compounds were detected in monitoring wells MW-4B, MW-30, MW-31-D, MW-32-S, MW-35, MW-36-D, MW-37-S, PZ-1B, and WC-1-S.

Vermont towns located within 4-radial miles of the Howe property include Rutland, Clarendon, Mendon, Proctor, Shrewsbury, and West Rutland [36; 37; 38; 39]. Proctor and Shrewsbury do not have public water supplies located within 4-radial miles of the Howe property [22; 23]. Thirteen public water supply wells are located within 4-radial miles of the Howe property, within the Towns of Rutland, West Rutland, and Clarendon [23].

Rutland is organized into three different villages: the City of Rutland, the Town of Rutland, and Center Rutland. The residents of the City of Rutland are served by the Rutland City Reservoir, located approximately 4.5 miles north of the Howe property and not on the 15-mile downstream surface water pathway [19]. Part of the Town of Rutland and Center Rutland are also supplied drinking water by the Rutland City Reservoir [20].

The Town of Rutland contains six groundwater drinking water supply wells located within 4-radial miles of the Howe property: Town of Rutland Water System (0.9 miles southwest); Grandview Acres (1.5 miles northeast); Killington Heights (1.75 miles east); Mountain View Estates (2.1 miles northeast); and Colonial Estates Water Corporation (3.75 miles northeast). These wells serve approximately 36, 125, 148, 56, and 150 people, respectively.

Center Rutland residents are supplied with groundwater from two fire district drinking water supply wells [9; 23]. Fire District No. 1 is located in the City of Rutland 2.0 miles southwest of the Howe property and serves approximately 500 people. Fire District No. 4 is located in the Town of Rutland 2.5 miles northeast of the Howe property and serves approximately 50 people.

The Town of West Rutland is supplied by two gravel-packed wells located on Fairview Road, approximately 3.3 miles southwest of the Howe property. These wells are located within 50 feet of each other and are considered one groundwater supply source. There are 700 households (approximately 2,500 people) served by the wells. The rest of the population is supplied by private drinking water supply wells [18].

The Town of Clarendon maintains two public drinking water supply sources, identified as Terrace Hills (spring) and the Coburn Mobile Home Park (bedrock well), located within 4-radial miles of the Howe property [16; 23]. Terrace Hills, 2.75 miles southwest, and Coburn Mobile Home Park, 2.75 miles south, serve approximately 30 and 110 people, respectively.

Rocky Ridge Home Owners, located 2.25 miles east in Mendon, supplies drinking water to an estimated 110 people. East Mountain Water Corporation, 2.5 miles northeast, is also located in Mendon, supplying an estimated 42 people with drinking water. The following table summarizes public groundwater supply sources within 4-radial miles of the Howe property.

## GROUNDWATER PATHWAY (Continued)

### Public Groundwater Supply Sources Within 4-Radial Miles of Howe Richardson Scale Co. (former)

Distance/ Direction from Site	Source Name	Location of Source <sup>a</sup>	Estimated Population Served	Source Type <sup>b</sup>
0.9 miles SW	Town of Rutland Water System	Town of Rutland	36	Bedrock
1.5 miles NE	Grandview Acres	Town of Rutland	125	Bedrock
1.75 miles E	Killington Heights	Town of Rutland	148	Bedrock
2.0 miles SW	Fire District No. 1	City of Rutland	500	Overburden
2.1 miles NE	Mountain View Estates	Town of Rutland	56	Bedrock
2.25 miles E	Rocky Ridge Home Owners	Mendon	110	Bedrock
2.5 miles NE	East Mountain Water Corporation	Mendon	42	Bedrock
2.5 miles NE	Fire District No. 4	Town of Rutland	50	Unknown
2.75 miles SW	Terrace Hills	Clarendon	30	Spring
2.75 miles S	Coburn Mobile Home Park	Clarendon	110	Bedrock
3.3 miles SW	West Rutland Water Wells	West Rutland	2,500	Overburden
3.75 miles NE	Colonial Estates Water Corporation	Town of Rutland	150	Bedrock

<sup>a</sup> Indicates Town in which well is located.

<sup>b</sup> Overburden, Bedrock, or Unknown.

[9; 16; 18; 19; 20; 22; 44]

Private groundwater supplies within 4-radial miles of the property were estimated using equal distribution calculations of U.S. Census CENTRACTS data identifying population, households, and private water wells for "Block Groups" which lie within or partially within individual radial distance rings of the Howe property. The nearest private drinking water supply well is located within 0.25- to 0.5-radial miles of the property [11]. The following table summarizes estimated drinking water populations served by groundwater sources within 4-radial miles of the Howe property.

## GROUNDWATER PATHWAY (Continued)

### Estimated Drinking Water Populations Served by Groundwater Sources Within 4-Radial Miles of Howe Richardson Scale Co. (former)

Radial Distance from the Howe Richardson Scale Co. (former) (miles)	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population Served by Groundwater Sources Within the Ring
≥ 0.00 to 0.25	0	0	0
> 0.25 to 0.50	3	0	3
> 0.50 to 1.00	48	36	84
> 1.00 to 2.00	539	773	1,312
> 2.00 to 3.00	982	398	1,380
> 3.00 to 4.00	1,016	2,650	3,666
TOTAL	2,588	3,857	6,445

[9; 11; 16; 19; 20; 22; 44]

During the on-site reconnaissance, six of the 16 monitoring wells were opened. START personnel obtained a PID reading of 2.1 units above background from MW-32S. No other PID readings were recorded from the remaining five monitoring wells. The monitoring wells were locked and observed to be in good condition except for MW-WC2 (shallow), which would not open due to rust.

START did not perform groundwater sampling as part of the Howe property SI. Based on analytical results from previous monitoring well sampling events conducted at the Howe property and the surrounding area, groundwater beneath the property has been impacted by a release of hazardous substances which appears to be at least partially attributable to on-site sources. However, based on the location and proximity of the surrounding residential wells, no nearby drinking water sources are known or suspected to have been impacted by the release from on-site sources. To date, the installation of a (former) recovery well, the removal of two No. 6 fuel oil USTs, and the excavated 35 cubic yards (yd<sup>3</sup>) of contaminated soils were the only actions taken to address the release to groundwater.

**SI TABLE 4: GROUNDWATER OBSERVED RELEASE SUBSTANCES (BY AQUIFER)**

Note: Mobility equals 1 for all observed release substances.

Sample ID	Hazardous Substance	Substance Concentration (ppb)	Bckgrd. ID.	Bckgrd. Conc.	Tox. × Mob. = Tox.	References
MW-4B (10/89)	Chloroethane	83	MW-PZ-2B	ND	1	4; 8
MW-4B (7/90)	Carbon tetrachloride	24	MW-PZ-2B	ND	1,000	4; 8
MW-4B (1/93)	Total xylenes	21.4	MW-PZ-2B	ND	10	4; 8
MW-36 (10/92)	Lead	28	MW-PZ-2B	ND	10,000	4; 8
MW-PZ-1B (7/92)	Benzene	24	MW-PZ-2B	ND	100	4; 8
MW-PZ-1B (7/90)	1,2-Dichlorobenzene	3,200	MW-PZ-2B	ND	10	4; 8
MW-PZ-1B (1/92)	1,3-Dichlorobenzene	240	MW-PZ-2B	ND	NL	4; 8
MW-PZ-1B (1/93)	1,4-Dichlorobenzene	14	MW-PZ-2B	ND	10	4; 8
MW-30 (7/94)	1,1,1-Trichloroethane	1,300	MW-PZ-2B	ND	1	4; 8
MW-31-D (7/95)	1,1-Dichloroethane	1,000	MW-PZ-2B	ND	10	4; 8
MW-32-S (7/94)	1,1-Dichloroethylene	1,000	MW-PZ-2B	ND	100	4; 8
MW-32-S (10/96)	1,2-Dichloroethane	220	MW-PZ-2B	ND	100	4; 8
MW-36-D (5/97)	Trichloroethylene	5,800	MW-PZ-2B	ND	10	4; 8
MW-37-S (10/95)	1,2-Dichloroethylene	44.9	MW-PZ-2B	ND	100	4; 8
MW-WC-1-5 (7/92)	Methylene chloride	260	MW-PZ-2B	ND	10	4; 8
Highest Value					10,000	

Notes: ND = Not detected.  
 ppb = Parts per billion.  
 Detection limit equals 5 ppb, with the exception of lead which has a detection limit of 2 ppb.



Notes: Convert all results and SCDM values to ppb or  $\mu\text{g/L}$ .

If sum of percents calculated for I or J index is  $\geq 100\%$ , consider the well a Level I target; if sum of I or J index is  $< 100\%$ , consider the well a Level II target.

**Level II:**

### References:

SCDM Version: JUN96

Notes: No known groundwater actual contamination targets have been documented to date.

## GROUNDWATER PATHWAY WORKSHEET

### LIKELIHOOD OF RELEASE

	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation support a release to the aquifer, assign a score of 550. Record observed release substances on SI Table 4.	550	+	4; 8
2. POTENTIAL TO RELEASE: Depth to aquifer: <u>2.68 to 19.83</u> feet. If sampling data do not support a release to the aquifer, and the site is in karst terrain or the depth to aquifer is 70 feet or less, assign a score of 590; otherwise, assign a score of 340. Optionally, evaluate potential to release according to MRS Section 3.1.2.			

LR = 550

### TARGETS

	Score	Data Type	Refs
Are any wells part of a blended system? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, attach a page to show apportionment calculations.			
3. ACTUAL CONTAMINATION TARGETS: If analytical evidence indicates that any target drinking water well for the aquifer has been exposed to a hazardous substance from the site, evaluate the factor score for the number of people served (SI Table 5).  Level I: $\frac{0}{10} \times 10 = 0$ Level II: $\frac{0}{1} \times 1 = 0$ Total =	0		
4. POTENTIAL CONTAMINATION TARGETS: Determine the number of people served by drinking water wells for the aquifer or overlying aquifers that are not exposed to a hazardous substance from the site; record the population for each distance category in SI Table 6a or 6b. Sum the population values and multiply by 0.1.	94.2	+	9; 10; 11; 19; 20; 22
5. NEAREST WELL: Assign a score of 50 for any Level I Actual Contamination Targets for the aquifer or overlying aquifer. Assign a score of 45 if there are Level II targets but no Level I targets. If no Actual Contamination Targets exist, assign the Nearest Well Score from SI Table 6a or 6b. If no drinking water wells exist within 4 miles, assign 0.	18		11
6. WELLHEAD PROTECTION AREA (WHPA): If any source lies within or above a WHPA for the aquifer, or if a groundwater observed release has occurred within a WHPA, assign a score of 20; assign 5 if neither condition applies but a WHPA is within 4 miles; otherwise assign 0.	5	+	10
7. RESOURCES: Assign a score of 5 if one or more groundwater resource applies; assign 0 if none applies. <ul style="list-style-type: none"> <li>• Irrigation (5 acre minimum) of commercial food crops or commercial forage crops</li> <li>• Watering or commercial livestock</li> <li>• Ingredient in commercial food preparation</li> <li>• Supply for commercial aquaculture</li> <li>• Supply for a major or designated water recreation area, excluding drinking water use</li> </ul>	5	-	

Sum of Targets T = 122.2

Notes: Resources value was assumed.

# SI TABLE 6 (FROM HRS TABLE 3-12): VALUES FOR POTENTIAL CONTAMINATION GROUNDWATER TARGET POPULATIONS

SI Table 6a: Other Than Karst Aquifers

Distance From Site	Pop.	Nearest Well (choose highest)	POPULATION SERVED BY WELLS WITHIN DISTANCE CATEGORY												Pop. Value	Ref.
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1000	1001 to 3000	3001 to 10000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000		
0 to 1/4 mile	0	20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455	0	11
> 1/4 to 1/2 mile	3	18	2	11	33	102	324	1,013	3,233	10,192	32,325	101,213	323,243	1,012,122	2	11
> 1/2 to 1 mile	84	9	1	5	17	52	167	523	1,669	5,234	16,684	52,239	166,835	522,385	17	11
> 1 to 2 miles	1,312	5	0.7	3	10	30	94	294	939	2,939	9,385	29,384	93,845	293,842	294	11
> 2 to 3 miles	1,380	3	0.5	2	7	21	68	212	678	2,172	6,778	21,222	67,777	212,219	212	11
> 3 to 4 miles	3,786	2	0.3	1	4	13	42	131	417	1,306	4,171	13,060	41,709	130,596	417	11
Nearest Well =		18													Sum =	
															942	

[9; 10; 11; 19; 20; 22]

Notes:

# GROUNDWATER PATHWAY WORKSHEET (Concluded)

## WASTE CHARACTERISTICS

	Score	Data Type	Does Not Apply																																	
<p>8. If any Actual Contamination Targets exist for the aquifer or overlying aquifers, assign the calculated hazardous waste quantity score or a score of 100, whichever is greater; if no Actual Contamination Targets exist, assign the hazardous waste quantity score calculated for sources available to migrate to groundwater.</p>	100	+	4; 8																																	
<p>9. Assign the highest groundwater toxicity × mobility value from SV Table 3 or 4.</p> <p>Substance(s): <u>Lead</u>      <u>Chromium</u>      <u>Carbon tetrachloride</u></p> <p>Value: <u>10,000</u>      <u>10,000</u>      <u>2,000</u></p> <p>From Table: <u>4</u>      <u>3</u>      <u>4</u></p>																																				
<p>10. Multiply the groundwater toxicity × mobility and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below: (from HRS Table 2-7)</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th>Product</th> <th>WC Score</th> <th>*</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td></td></tr> <tr><td>&gt;0 to &lt;10</td><td>1</td><td></td></tr> <tr><td>≥10 to &lt;100</td><td>2</td><td></td></tr> <tr><td>≥100 to &lt;1,000</td><td>3</td><td></td></tr> <tr><td>≥1,000 to &lt;10,000</td><td>6</td><td></td></tr> <tr><td>≥10,000 to &lt;1E+05</td><td>10</td><td></td></tr> <tr><td>≥1E+05 to &lt;1E+06</td><td>18</td><td></td></tr> <tr><td>≥1E+06 to &lt;1E+07</td><td>32</td><td></td></tr> <tr><td>≥1E+07 to &lt;1E+08</td><td>56</td><td></td></tr> <tr><td>≥1E+08 or greater</td><td>100</td><td></td></tr> </tbody> </table> <p>*check (✓) the WC score calculated for the pathway</p>	Product	WC Score	*	0	0		>0 to <10	1		≥10 to <100	2		≥100 to <1,000	3		≥1,000 to <10,000	6		≥10,000 to <1E+05	10		≥1E+05 to <1E+06	18		≥1E+06 to <1E+07	32		≥1E+07 to <1E+08	56		≥1E+08 or greater	100				
Product	WC Score	*																																		
0	0																																			
>0 to <10	1																																			
≥10 to <100	2																																			
≥100 to <1,000	3																																			
≥1,000 to <10,000	6																																			
≥10,000 to <1E+05	10																																			
≥1E+05 to <1E+06	18																																			
≥1E+06 to <1E+07	32																																			
≥1E+07 to <1E+08	56																																			
≥1E+08 or greater	100																																			
WC =	32																																			

Multiply LR by T and by WC. Divide the product by 82,500 to obtain the groundwater pathway score for each aquifer. Select the highest aquifer score. If the pathway score is greater than 100, assign 100.

GROUNDWATER PATHWAY CALCULATION:

$$\frac{LR \times T \times WC}{82,500} =$$

26.07

(Maximum of 100)

Notes:  $(550 \times 122.2 \times 32) \div 82,500 = 26.07$

## SURFACE WATER PATHWAY

**Pathway Description and Scoring Notes:** Describe the Surface Water Migration Pathway. Identify the nearest source area with non-zero containment for the Surface Water Pathway and the location of the PPE. Include the length of the overland segment. Describe the in-water segment up to the target distance limit noting the stream flow characteristics of each reach and the locations of drinking water intakes, fisheries and sensitive environments along the 15-mile pathway.

Briefly discuss any sampling events relative to the Surface Water Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

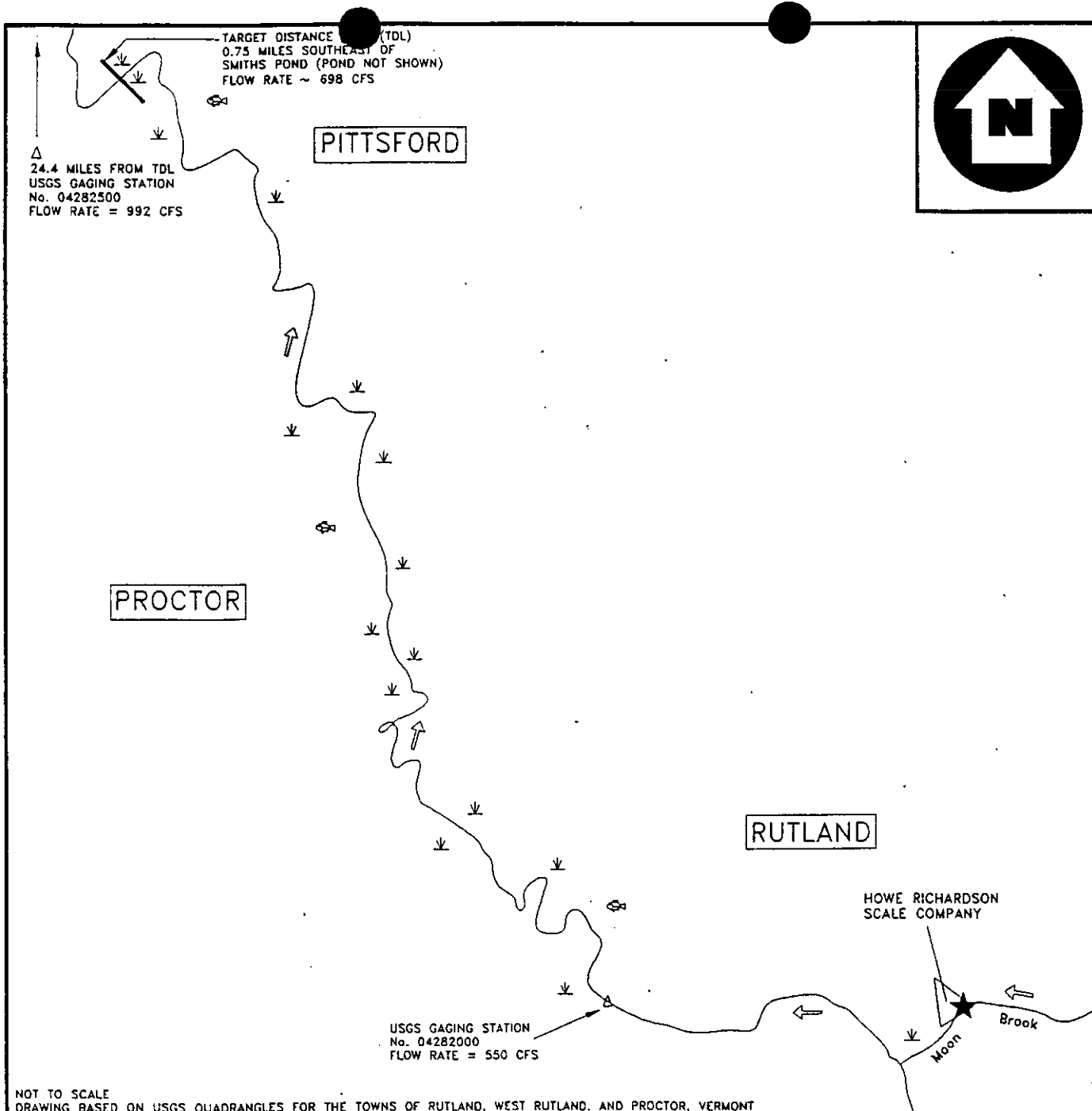
Indicate any assumptions you have made in scoring the Surface Water Pathway for this site, or any factors which influenced your scoring rationale.

Note: If a site has more than one watershed or has both overland/flood and groundwater to surface water migration potential, document each scenario and use the higher scoring watershed/migration route to calculate the surface water migration pathway score. Provide a summary of the scores for all other watershed migration routes.

The topography of the Howe property is flat with a slight slope to the south. Approximately 75% of the property is covered by impermeable material (i.e., building footprint and asphalt-paved areas) [4]. As a result, precipitation falling on the northern portion of the property is likely to migrate by overland flow rather than infiltrate into the subsurface. START personnel observed five catchbasins located on the northern portion of the property. According to Mr. Joseph Giancola, these catchbasins are connected to the municipal sewer system. Overland flow for the northern portion (not redirected by catchbasins) and precipitation falling on the southern portion of the property are likely to migrate off site by overland flow and infiltrate into the subsurface. Runoff from the property travels south into Moon Brook, except from portions of the property located south of Moon Brook where runoff travels northwest. Moon Brook traverses the southeast portion of the property and bounds the property to the southwest [7].

The most upstream probable point of entry (PPE) into the surface water for overland flow originating from the property is the southeastern portion of the property where the most upstream point of the reach of Moon Brook is located (Figure 3). From the PPE, Moon Brook flows in a southeasterly direction for approximately 0.9 miles until it reaches Otter Creek [36; 37; 38; 39]. The average surface water flow rate of Moon Brook (1.6 cubic feet per second (cfs)) at the PPE was estimated by START personnel using measurements gathered by PJD, Inc. [26]. The surface water flow rate for Moon Brook (3.22 cfs) at the confluence with Otter Creek was calculated by multiplying the square mileage of the drainage basin area by the U. S. Geological Survey (USGS) estimating factor of 1.8 cfs per square mile. The remaining 14.1 miles of the 15-mile surface water pathway are comprised of Otter Creek. The 15-mile downstream surface water pathway ends 0.75 miles southeast of Smiths Pond in Pittsford, Vermont [36; 37; 38; 39].

Surface water flow rates for Otter Creek, which were determined from two gaging stations located approximately 2.7 and 39.4 miles downstream from the PPE, were obtained from *Water Resources Data New Hampshire and Vermont - Water Year 1995*, published by the USGS. USGS gaging station number 04282000 is on Otter Creek approximately 1.8 miles downstream from the Moon Brook/Otter Creek confluence and has recorded a long term mean annual flow rate of 550 cfs [41]. USGS gaging station number 04282500 is on Otter Creek approximately 24.4 miles downstream of the 15-mile downstream surface water pathway terminus, and has recorded a long term mean



# LEGEND

- |   |                     |   |                              |   |                         |
|---|---------------------|---|------------------------------|---|-------------------------|
| △ | USGS GAGING STATION | ← | SURFACE WATER FLOW DIRECTION | 🐟 | FISHERY                 |
| ~ | WETLAND             |   |                              | ★ | PROBABLE POINT OF ENTRY |

## SURFACE WATER PATHWAY SKETCH

HOWE RICHARDSON SCALE CO. (FORMER)  
1 SCALE AVENUE  
RUTLAND, VERMONT



REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD # 98-05-0035	DRAWN BY: P. PANZA	DATE 1/16/98
FILE NAME: S:\97040015\FIG3.DWG		FIGURE 3

## SURFACE WATER PATHWAY (Continued)

annual flow rate of 992 cfs [41]. The flow rates for Otter Creek were extrapolated to determine the approximate flow rate at the confluence with Moon Brook (538 cfs) and at the 15-mile downstream terminus (698 cfs), respectively. The following table summarizes surface water bodies, flow characteristics, and wetlands frontage for the 15-mile downstream surface water pathway.

**Surface Water Bodies Along the 15-Mile Downstream Pathway from  
Howe Richardson Scale Co. (former)**

Surface Water Body	Descriptor <sup>a</sup>	Length of Reach (miles)	Flow Characteristics (cfs) <sup>b</sup>	Length of Wetland Frontage (miles)
Moon Brook	Minimal Stream	0 to 0.9	1.6 to 3.2	0.1
Otter Creek	Moderate to Large Stream	0.9 to 15	538 to 698	3.5

<sup>a</sup> Minimal stream < 10 cfs. Small to moderate stream 10-100 cfs. Moderate to large stream > 100-1,000 cfs. Large stream to river > 1,000-10,000 cfs. Large river > 10,000-100,000 cfs. Very large river > 100,000 cfs. Coastal tidal waters (flow not applicable). Shallow ocean zone or Great Lake (flow not applicable). Moderate depth ocean zone or Great Lake (flow not applicable). Deep ocean zone or Great Lake (flow not applicable). Three-mile mixing zone in quiet flowing river 10 cfs or greater.

<sup>b</sup> Cubic feet per second.

[12; 26; 32; 33; 34; 35; 36; 37; 38; 39; 41]

There are no known surface water drinking water intakes used for public drinking water supplies along the 15-mile downstream pathway from the Howe property [28]. Otter Creek is considered to be a Rainbow Trout, Large and Smallmouth Bass, and Northern Pike fishery [14]. No sensitive environments were reported by the Vermont Department of Fish and Wildlife to exist along the 15-mile downstream surface water pathway [25]. There are approximately 0.1 miles and 3.5 miles of wetlands frontage along Moon Brook and Otter Creek, respectively [32; 33; 34; 35]. The nearest wetlands, with a frontage of approximately 0.1 miles, is located on Moon Brook, 0.75 miles from the PPE. The following table summarizes the sensitive environments located along the downstream pathway from the Howe property.

## SURFACE WATER PATHWAY (Continued)

### Sensitive Environments Along the 15-Mile Downstream Pathway from Howe Richardson Scale Co. (former)

Sensitive Environment Name	Sensitive Environment Type	Surface Water Body	Downstream Distance from PPE (miles)	Flow Rate at Environment (cfs) <sup>a</sup>
CWA	CWA	Moon Brook	0 to 0.9	1.6 to 3.2
Wetlands (0.1 miles)	Wetlands	Moon Brook	0.75 to 0.85	2.95 to 3.13
Wetlands (3.5 miles)	Wetlands	Otter Creek	2.9 to 15	552 to 698

<sup>a</sup> Cubic feet per second

CWA = Clean Water Act

PPE = Probable Point of Entry

[12; 25; 32; 33; 34; 35]

START did not perform surface water pathway sampling as part of the Howe property SI. No other surface water pathway sampling is known to have been conducted for the Howe property. No Clean Water Act-protected water body, fisheries, or sensitive environments are known or suspected to have been impacted.



**SI TABLE 7: SURFACE WATER OBSERVED RELEASE SUBSTANCES**

List all substances that meet the criteria for an observed release to surface water; however do not eliminate a substance from this table if it has a BCF of less than 500.

[illegible]

Notes: No known surface water observed release substances have been collected to date.

**SI TABLE 8: SURFACE WATER DRINKING WATER ACTUAL CONTAMINATION TARGETS**

Notes: Convert all results and SCDM values to ppb or  $\mu\text{g/L}$ .  
If sum of percents calculated for I or J index is  $\geq 100$  percent, consider the intake a Level I target; if sum of I or J index is  $< 100$  percent consider the intake a Level II target.

Intake ID:		Sample Type:		Level I:		Level II:		Population Served:		References:	
Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	RfD (J Index)	% of RfD	Cancer Risk Conc. (J Index)	% of Cancer Risk Conc.			
Highest Percent					Sum of Percents						

SCDM Version: JUN96

Notes: No known surface water drinking water actual contamination targets have been collected to date.

# SURFACE WATER PATHWAY LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT WORKSHEET

## LIKELIHOOD OF RELEASE - OVERLAND/FLOOD MIGRATION

	Score	Data Type	Refs												
1. OBSERVED RELEASE: If sampling data or direct observation support a release to surface water in the watershed, assign a score of 550. Record observed release substances on SI Table 7.															
2. POTENTIAL TO RELEASE: Distance to surface water: 0 (feet) If sampling data do not support a release to surface water in the watershed, use the table below to assign a score from the table below based on distance to surface water and flood frequency.															
<table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td>Distance to surface water &lt; 2500 feet</td> <td>500</td> </tr> <tr> <td>Distance to surface water &gt; 2500 feet, and:</td> <td></td> </tr> <tr> <td>Site in annual or 10-yr floodplain</td> <td>500</td> </tr> <tr> <td>Site in 100-yr floodplain</td> <td>400</td> </tr> <tr> <td>Site in 500-yr floodplain</td> <td>300</td> </tr> <tr> <td>Site outside 500-yr floodplain</td> <td>100</td> </tr> </table>	Distance to surface water < 2500 feet	500	Distance to surface water > 2500 feet, and:		Site in annual or 10-yr floodplain	500	Site in 100-yr floodplain	400	Site in 500-yr floodplain	300	Site outside 500-yr floodplain	100			
Distance to surface water < 2500 feet	500														
Distance to surface water > 2500 feet, and:															
Site in annual or 10-yr floodplain	500														
Site in 100-yr floodplain	400														
Site in 500-yr floodplain	300														
Site outside 500-yr floodplain	100														
Optionally, evaluate surface water potential to release according to HRS Section 4.1.2.1.2	500	-													
<b>LR =</b>	500														

## LIKELIHOOD OF RELEASE - GROUNDWATER TO SURFACE WATER MIGRATION

	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation support a release to surface water in the watershed, assign a score of 550. Record observed release substances on SI Table 7.			
NOTE: Evaluate groundwater to surface water migration only for a surface water body that meets all of the following conditions:			
1) A portion of the surface water is within 1 mile of site sources having a containment factor greater than 0.			
2) No aquifer discontinuity is established between the source and the above portion of the surface water body.			
3) The top of the uppermost aquifer is at or above the bottom of the surface water. Elevation of top of uppermost aquifer: _____ Elevation of bottom of surface water body: _____	NE		
2. POTENTIAL TO RELEASE: Depth to aquifer: <u>2.68 to 19.83</u> feet. If sampling data do not support a release to the aquifer, and the site is in karst terrain or the depth to aquifer is 70 feet or less assign a score of 500; otherwise assign a score of 340. Optionally, evaluate potential to release according to HRS Section 3.1.2.	500	-	
<b>LR =</b>	500		

Notes: NE = Not evaluated.

Alternate Scenario: If sediment sampling data or direct observation support an observed release of a substance with a BCF  $\geq$  500, the likelihood of release value increases to 550.

**SURFACE WATER PATHWAY  
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT WORKSHEET  
(Continued)**

**DRINKING WATER THREAT TARGETS**

Record the water body type, flow, and number of people served by each drinking water intake within the distance limit in the watershed. If there is no drinking water intake within the target distance limit, assign 0 to factors 3, 4, and 5.

Intake Name	Water Body Type	Flow	People Served
No Intakes			

Are any intakes part of a blended system? Yes ☐ No ☐  
If yes, attach a page to show apportionment calculations.

3. **ACTUAL CONTAMINATION TARGETS:** If analytical evidence indicates a drinking water intake has been exposed to a hazardous substance from the site, list the intake name and evaluate the factor score for the drinking water population (SI Table 8).

Level I: 0 people  $\times$  10 = 0

Level II: 0 people  $\times$  1 = 0

**Total =**

0

+

28

4. **POTENTIAL CONTAMINATION TARGETS:** Determine the number of people served by drinking water intakes for the watershed that have not been exposed to a hazardous substance from the site. Assign the population values from SI Table 9. Sum the values and multiply by 0.1.

0

5. **NEAREST INTAKE:** Assign a score of 50 for any Level I Actual Contamination Drinking Water Targets for the watershed. Assign a score of 45 if there are Level II targets for the watershed, but no Level I targets. If no Actual Contamination Drinking Water Targets exist, assign a score for the intake nearest the PPE from SI Table 9. If no drinking water intakes exist, assign 0.

0

6. **RESOURCES:** Assign a score of 5 if one or more surface water resource applies; assign 0 if none applies.

- Irrigation (5-acre minimum) of commercial food crops or commercial storage crops
- Watering of commercial livestock
- Ingredient in commercial food preparation
- Major or designated water recreation area, excluding drinking water use.

5

**Sum of Targets T =**

5

Notes: Resources value was assumed.

**SI TABLE 9 (FROM HRS TABLE 4-14): DILUTION-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FOR SURFACE WATER MIGRATION PATHWAY<sup>(a)</sup>**

Type of Surface Water Body <sup>(b)</sup>	Pop.	Nearest Intake	NUMBER OF PEOPLE								Pop. Value
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	
Minimal Stream (< 10 cfs)	0	20	4	17	53	164	522	1,633	5,214	16,325	0
Small to moderate stream (10 to 100 cfs)	0	2	0.4	2	5	16	52	163	521	1,633	0
Moderate to large stream (> 100 to 1,000 cfs)	0	0	0.04	0.2	0.5	2	5	16	52	163	0
Large Stream to river (> 1,000 to 10,000 cfs)	0	0	0.004	0.02	0.05	0.2	0.5	2	5	16	0
Large River (> 10,000 to 100,000 cfs)	0	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2	0
Very Large River (> 100,000 cfs)	0	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2	0
Shallow ocean zone or Great Lake (depth < 20 feet)	0	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2	0
Moderate ocean zone or Great Lake (Depth 20 to 200 feet)	0	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2	0
Deep ocean zone or Great Lake (depth > 200 feet)	0	0	0	0	0	0.001	0.003	0.008	0.03	0.08	0
3-mile mixing zone in quiet flowing river ( $\geq$ 10 cfs)	0	10	2	9	26	82	261	817	2,607	8,163	0

**SI TABLE 9 (FROM HRS TABLE 4-14): DILUTION-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FOR SURFACE WATER MIGRATION PATHWAY<sup>(a)</sup> (Continued)**

Type of Surface Water Body	Pop.	NUMBER OF PEOPLE					Pop. Value
		30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	3,000,001 to 10,000,000	
Minimal Stream (< 10 cfs)	0	52,137	163,246	521,360	1,632,455	5,213,590	0
Small to moderate stream (10 to 100 cfs)	0	5,214	16,325	52,136	163,245	521,359	0
Moderate to large stream (> 100 to 1,000 cfs)	0	521	1,633	5,214	16,325	52,136	0
Large Stream to river (> 1,000 to 10,000 cfs)	0	52	163	521	1,632	5,214	0
Large River (> 10,000 to 100,000 cfs)	0	5	16	52	163	521	0
Very Large River (> 100,000 cfs)	0	0.5	2	5	16	52	0
Shallow ocean zone or Great Lake (depth < 20 feet)	0	5	16	52	163	521	0
Moderate ocean zone or Great Lake (Depth 20 to 200 feet)	0	0.5	2	5	16	52	0
Deep ocean zone or Great Lake (depth > 200 feet)	0	0.3	1	3	8	26	0
3-mile mixing zone in quiet flowing river ( $\geq$ 10 cfs)	0	26,068	81,623	260,680	816,227	2,606,795	0
Sum =							0

<sup>a</sup> Round the number of people to nearest integer. Do not round the assigned dilution-weighted population value to nearest integer.

<sup>b</sup> Treat each lake as a separate type of water body and assign it a dilution-weighted population value using the surface water body type with the same dilution weight from HRS Table 4-13 as the lake. If drinking water is withdrawn from coastal tidal water or the ocean, assign a dilution-weighted population value to it using the surface water body type with the same dilution weight from HRS Table 4-13 as the coastal tidal water or the ocean zone.

# SI TABLE 10: HUMAN FOOD CHAIN ACTUAL CONTAMINATION TARGETS FOR WATERSHED

Notes: Convert all results and SCDM values to  $\mu\text{g/kg}$  or ppb.  
If sum of percents calculated for I or J index is  $\geq 100\%$ , consider the fishery a Level I target; if sum of I or J index is  $< 100$  percent consider the fishery a Level II target. List only those substances that meet the observed release criteria in a fishery within the target distance limit and have a BCF of  $\geq 500$ ; BCF values are found on SI Table 7.

Fishery ID:		Sample Type:		Level I:	Level II:	References:		
Sample ID	Hazardous Substance	Conc. ( $\mu\text{g/kg}$ )	Benchmark Conc. (FDAAL)	% of Benchmark	RfD (J index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.
				Highest Percent	Sum of Percents		Sum of Percents	

Notes: No known human food chain actual contamination targets for watershed have been collected to date.

# SI TABLE 11: SENSITIVE ENVIRONMENT ACTUAL CONTAMINATION TARGETS FOR WATERSHED

Notes: Convert all results and SCDM values to  $\mu\text{g/L}$  or ppb.  
If the highest % of benchmark calculated is  $\geq 100\%$ , consider the sensitive env. a Level I target; if the highest % of benchmark calculated is  $< 100\%$  consider the sensitive env. a Level II target.

Environment ID:		Sample Type:		Level I:	Level II:	Environment Value:	
Sample ID	Hazardous Substance	Conc. ( $\mu\text{g/L}$ )	Benchmark Conc. (AWQC or AALAC)	% of Benchmark	References		
				Highest Percent			

SCDM Version: JUN96

Notes: No known sensitive environments actual contamination targets for watershed have been documented to date.

**SURFACE WATER PATHWAY (Continued)**  
**HUMAN FOOD CHAIN THREAT WORKSHEET**

HUMAN FOOD CHAIN THREAT TARGETS	Score	Data Type	Refs										
Record the water body type and flow for each fishery within the target distance limit. If there is no fishery within the target distance limit, assign a score of 0 at the bottom of this page.													
Fishery Name: Moon Brook      Water Body: Minimal Stream      Flow: .6 to 3.22 cfs Species: Unknown              Production: lbs/yr													
Fishery Name: Otter Creek      Water Body: Mod. to Lg. Stream      Flow: 638 to 698 cfs Species: Unknown              Production: lbs/yr													
<b>FOOD CHAIN INDIVIDUAL (Select highest value)</b>													
<b>7. ACTUAL CONTAMINATION FISHERIES:</b>  Assign 50 points for a Level I fishery only if tissue samples document an observed release of a substance with a BCF $\geq 500$ to a fishery within the target distance limit (SI Table 10). List substance(s): _____.  Assign 45 points for a Level II fishery if surface water/sediment samples document an observed release of a substance with a BCF $\geq 500$ to a fishery within the target distance limit (SI Table 10). List substance(s): _____.													
<b>8. POTENTIAL CONTAMINATION FISHERIES:</b>  Assign 20 points for a potential fishery if there is an observed release of a substance with a BCF $\geq 500$ (SI Table 7) to a watershed containing fisheries within the target distance limit, but no Level I or Level II fisheries are scored because there is no fishery documented between the PPE and the most downstream observed release sample point.  If there is no observed release of a substance with a BCF $\geq 500$ to a watershed, assign a value for potential contamination fisheries from the table below using the lowest flow of all fisheries within the target distance limit.													
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:40%;">Lowest Flow</th> <th style="width:60%;">FCI Value</th> </tr> </thead> <tbody> <tr> <td>&lt; 10 cfs</td> <td>20</td> </tr> <tr> <td>10 to 100 cfs</td> <td>2</td> </tr> <tr> <td>&gt; 100 cfs, coastal tidal waters, oceans, or Great Lakes</td> <td>0</td> </tr> <tr> <td>3-mile mixing zone in quiet flowing river</td> <td>10</td> </tr> </tbody> </table>	Lowest Flow	FCI Value	< 10 cfs	20	10 to 100 cfs	2	> 100 cfs, coastal tidal waters, oceans, or Great Lakes	0	3-mile mixing zone in quiet flowing river	10			
Lowest Flow	FCI Value												
< 10 cfs	20												
10 to 100 cfs	2												
> 100 cfs, coastal tidal waters, oceans, or Great Lakes	0												
3-mile mixing zone in quiet flowing river	10												
<b>FCI Value =</b>	20												
<b>Targets    T =</b>	20												

Notes: Alternate Scenario: If sediment sampling data or direct observation support an observed release of a substance with a BCF  $\geq 500$ , and Level II Human Food Chain targets, the targets value increases to 45..

# SURFACE WATER PATHWAY (Continued) ENVIRONMENTAL THREAT WORKSHEET

When measuring length of wetlands that are located on both sides of a surface water body, sum both frontage lengths. For a sensitive environment that is more than one type, assign a value for each type.

## ENVIRONMENTAL THREAT TARGETS

						Score	Data Type	Refs
Record the water body and flow for each surface water sensitive environment within the target distance limit (see SI Table 12). If there is no sensitive environment within the target distance limit, assign a score of 0 at the bottom of the page.								
Environment Type (SI Table 13) Water Body Name Flow								
Clean Water Act		Minimal Stream		1.6 to 3.2 cfs				
Wetlands (0.1 miles)		Minimal Stream		2.95 to 3.13 cfs				
Wetlands (3.5 miles)		Mod. to Lg. Stream		552 to 698 cfs				
9. ACTUAL CONTAMINATION SENSITIVE ENVIRONMENTS: If sampling data or direct observation indicate any sensitive environment has been exposed to a hazardous substance from the site, record this information on SI Table 11, and assign a factor value for the environment (SI Tables 13 and 14).  Substance(s): _____  From Table: _____								
Environment Type (SI Table 13)	Environment Value (SI Tables 13 and 14)	Multiplier (10 for Level I, 1 for Level II)	Product					
		×	=					
		×	=					
		×	=					
		×	=					
Sum =						0		
10. POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS:								
Flow	Dilution weight (SI Table 12)	Environment Type and Value (SI Tables 13 & 14)	Pot. Cont.	Product				
< 10 cfs	1	5 (Clean Water Act)	×	0.1 =	0.5			
< 10 cfs	1	25 (0.1 mi. wetlands)	×	0.1 =	2.5			
> 100 to 1,000 cfs	0.01	100 (3.5 mi. wetlands)	×	0.1 =	0.1			
Sum =						3.1		
Sum of Targets T =						3.1		
							+	32; 35

Notes: Alternate Scenario: If sediment sampling data or direct observation support an observed release of a substance in SI Table 3 with Level II actual contamination sensitive environment targets (25 pts for 0.1 miles wetlands and 5 pts for CWA), the targets value increases to 30.1.



**SI TABLE 12 (HRS TABLE 4-13):  
SURFACE WATER DILUTION WEIGHTS**

* <input type="checkbox"/>	TYPE OF SURFACE WATER BODY		Assigned Dilution Weight
	Descriptor	Flow Characteristics	
<input checked="" type="checkbox"/>	Minimal stream	< 10 cfs	1
<input type="checkbox"/>	Small to moderate stream	10 to 100 cfs	0.1
<input checked="" type="checkbox"/>	Moderate to large stream	> 100 to 1,000 cfs	0.01
<input type="checkbox"/>	Large stream to river	> 1,000 to 10,000 cfs	0.001
<input type="checkbox"/>	Large river	10,000 to 100,000 cfs	0.0001
<input type="checkbox"/>	Very large river	> 100,000 cfs	0.00001
<input type="checkbox"/>	Coastal tidal waters	Flow not applicable; depth not applicable	0.0001
<input type="checkbox"/>	Shallow ocean zone or Great Lake	Flow not applicable; depth less than 20 feet	0.0001
<input type="checkbox"/>	Moderate depth ocean zone or Great Lake	Flow not applicable; depth 20 to 200 feet	0.00001
<input type="checkbox"/>	Deep ocean zone or Great Lake	Flow not applicable; depth greater than 200 feet	0.000005
<input type="checkbox"/>	3-mile mixing zone in quiet flowing river	10 cfs or greater	0.5

\* Check all (✓) appropriate dilution weights.

Notes:

**SI TABLE 13 (HRS TABLE 4-23):  
SURFACE WATER AND AIR SENSITIVE ENVIRONMENTS VALUES**

*	Sensitive Environment	Assigned Value
	Critical habitat for Federal designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Ecologically important areas identified under the Coastal Zone Wilderness Act Sensitive Areas identified under the National Estuary Program or Near Coastal Water Program of the Clean Water Act Critical Areas identified under the Clean Lakes Program of the Clean Water Act (subareas in lakes or entire small lakes) National Monument (air pathway only) National Seashore Recreation Area National Lakeshore Recreation Area	100
	Habitat known to be used by Federal designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Coastal Barrier (undeveloped) Federal land designated for the protection of natural ecosystems Administratively Proposed Federal Wilderness Area Spawning areas critical for the maintenance of fish/shellfish species within a river system, bay or estuary Migratory pathways and feeding areas critical for the maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time Terrestrial areas utilized by large or dense aggregations of vertebrate animals (semi-aquatic foragers) for breeding National river reach designated as recreational	75
	Habitat known to be used by State designated endangered or threatened species Habitat known to be used by a species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federally designated Scenic or Wild River	50
	State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Area Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
✓	State designated areas for the protection and maintenance of aquatic life under the Clean Water Act	5
✓	Wetlands      See SI Table 14 (Surface Water Pathway) or SI Table 23 (Air Pathway)	

\* Check (✓) all environments impacted or potentially impacted by the site.

**SI TABLE 14 (HRS TABLE 4-24): SURFACE WATER WETLANDS FRONTAGE VALUES**

*	TOTAL LENGTH OF WETLANDS	ASSIGNED VALUE
	Less than 0.1 mile	0
	0.1 to 1 mile	25
	Greater than 1 to 2 miles	50
	Greater than 2 to 3 miles	75
	Greater than 3 to 4 miles	100
	Greater than 4 to 8 miles	150
	Greater than 8 to 12 miles	250
	Greater than 12 to 16 miles	350
	Greater than 16 to 20 miles	450
	Greater than 20 miles	500

\* Check (✓) highest value for each applicable flow characteristic.

Notes:

# SURFACE WATER PATHWAY (Concluded)

## WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE SUMMARY

### WASTE CHARACTERISTICS

11. If an Actual Contamination Target (drinking water, human food chain, or environmental threat) exists for the watershed, assign the calculated hazardous waste quantity score, or a score of 100, whichever is greater. If no Actual Contamination Targets exist, assign the hazardous waste quantity score calculated for sources available to migrate to surface water.

Score

100

12. Assign the highest value from SI Table 3 or SI Table 7 for the hazardous substance waste characterization factors below. Multiply each by the surface water hazardous waste quantity score and determine the waste characteristics score for each threat.

	DWT	HFCT	ET
Substance(s):	Lead	Lead	Lead
Value*:	10,000	5E+05	5E+06
From Table:	3	3	3

Note: Chromium DWT = 10,000 (from Table 3)

\*Overland/flood migration values used.

13. Multiply the toxicity and hazardous waste quantity scores. Assign the waste characteristics score for each threat from the table below.

Product	WC Score	DWT	HFCT	ET
0	0			
>0 to <10	1			
≥10 to <100	2			
≥100 to <1,000	3			
≥1,000 to <10,000	6			
≥10,000 to <1E+05	10			
≥1E+05 to <1E+06	32			
≥1E+06 to <1E+07	56	✓		
≥1E+07 to <1E+08	100		✓	
≥1E+08 to <1E+09	180			✓
≥1E+09 to <1E+10	320			
≥1E+10 to <1E+11	560			
≥1E+11 to <1E+12	1000			
≥1E+12 or greater				

\*check (✓) the WC score calculated for each threat

	Substance Value	HWQ	Product	WC Score (from Table)	
Drinking Water Threat (DWT) Toxicity × Persistence	10,000 ×	100 =	1E+06	32	(Maximum of 100)
Food Chain Threat (HFCT) Toxicity × Persistence Bioaccumulation	5E+05 ×	100 =	5E+07	56	(Maximum of 1000)
Environmental Threat (ET) Ecotoxicity × Persistence × Ecobioaccumulation	5E+06 ×	100 =	5E+08	100	(Maximum of 1000)

# **SURFACE WATER PATHWAY THREAT SCORES**

Threat (T)	Likelihood of Release (LR) Score	Targets (T) Score	Pathway Waste Characteristics (WC) Score (determined above)	Threat Score $\frac{LR \times T \times WC}{82,500}$
Drinking Water (DW)	500	5	32	0.97 (Maximum of 100)
Human Food Chain (HFC)	500	20	56	6.79 (Maximum of 100)
Environmental (E)	500	3.1	100	1.88 (Maximum of 60)

Multiply LR by T and by WC. Divide the product by 82,500 for each threat (T). Sum the threat scores to obtain the surface water pathway score for each watershed/migration route. Select the highest watershed/migration route score. If the pathway score is greater than 100, assign 100.

## **SURFACE WATER PATHWAY CALCULATION:**

$$(DWT + HFCT + ET) =$$

9.64

(Maximum of 100)

$$DW = (500 \times 5 \times 32) \div 82,500 = 0.97$$

$$HFC = (500 \times 20 \times 56) \div 82,500 = 6.79$$

$$E = (500 \times 3.1 \times 100) \div 82,500 = 1.88$$

$$(0.97 + 6.79 + 1.88) = 9.64$$

Notes: Alternate Scenario: If sampling data or direct observation supported an observed release to the surface water pathway, with Level II fishery and sensitive environment (CWA, wetland) targets:

$$DW = (550 \times 5 \times 32) \div 82,500 = 1.07$$

$$HFC = (550 \times 45 \times 56) \div 82,500 = 16.8$$

$$E = (550 \times 30.1 \times 100) \div 82,500 = 20.07$$

$$(DW + HFC + E) = (1.07 + 16.8 + 20.07) = 37.94$$

## SOIL EXPOSURE PATHWAY

**Pathway Description and Scoring Notes:** Identify all areas of observed contamination. Indicate whether a resident population is associated with the site and characterize the area surrounding the site. Identify the nearby population and any terrestrial sensitive environments located within the target distance limit.

Briefly discuss any sampling events relative to the Soil Exposure Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Soil Exposure Pathway for this site, or any key factors which influenced your scoring rationale.

Approximately 75% of the Howe property is covered by impermeable material (i.e., building footprint and asphalt-paved areas) [4]. START personnel observed chain-link fences and buildings enclosing the majority of the property. In addition to Moon Brook, railroad tracks on the north, east, and west further restrict access. The parcel is zoned industrial, and is bound by Moulthrop Avenue to the southeast, a business located at Porter Place to the south, a residence located on Park Street to the southwest, and by railroad tracks to the north, east, and west. There are no known terrestrial sensitive environments located on the property [25].

Various tenants on the property employ approximately 300 full-time personnel. The nearest residence is located approximately 150 feet west of the Howe property at 93 Strongs Avenue. No known schools or day-care centers are located within 200 feet of observed contamination on the property. START personnel observed three classrooms in Building No. 3 (Castleton State College). These classrooms hold seminars for transient students and are not located within 200 feet of a source area. An estimated 10,288 people reside within 1-radial mile from the subject property.

Located in the center of Building No. 16, under the only car lift, was a floor drain. START personnel presume that this drain redirects flow to a flush effluent pipe located in the rear (west) of Building No. 16. START personnel also presume that this effluent pipe is the discharge pipe mentioned in the FY EC. START personnel estimated that 8 ft<sup>2</sup> of black, discolored soil was located near the effluent pipe [15]. In addition, a PID reading of 93 units above background levels within the first inch of soil was recorded [7]. The depth of contaminated soil is unknown, but is presumed to extend approximately 6 feet to the groundwater table. There was stressed vegetation located near and adjacent to the stained soil [7].

According to Peter Giancola, following the START on-site reconnaissance, Hank's Auto Repair closed and Building No. 16 was leased to another automobile repair shop [43]. He also stated that the floor drain and outlet (effluent) pipe were closed in place using cement grout. Mr. Giancola stated that regarding the floor drain "we will be contacting Mr. Charles Schwer of VT DEC regarding the stained area identified in the Draft SI report. We anticipate that we will work with VT DEC to remove soil in the stained area. It is likely that the soils will be poly-encapsulated on site in a secure area. The removal of these soils will be documented and reported to VT DEC" [43].

## SOIL EXPOSURE PATHWAY (Continued)

START did not perform surface soil sampling as part of the Howe property SIP. No surface soil sampling is known to have been conducted for the Howe property. Based on the available data no release of hazardous substances to surficial soils from on-site sources has been documented. Furthermore, based on the site observations and conditions, property access restrictions, and distance to nearest residence (approximately 150 ft), no impacts to nearby residential populations are known or suspected.

**SI TABLE 15a: SOIL EXPOSURE OBSERVED CONTAMINATION SUBSTANCES**

Source ID:

[illegible]

Notes: No known soil exposure observed contamination substances have been documented to date.

**SI TABLE 15b: SOIL EXPOSURE RESIDENT POPULATION TARGETS**

Notes: Convert all results and SCDM values to  $\mu\text{g/kg}$  or ppb. If sum of percent calculated for I or J index is  $\geq 100\%$  consider residents Level I targets; if sum of I or J index is  $< 100\%$ , consider the residents Level II targets.

Residence ID:

~~Level I:~~

~~Level II:~~

**Population:**

Sample ID	Hazardous Substance	Conc. ( $\mu\text{g/kg}$ )	RfD (J index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.	References
Sum of Percents					Sum of Percents		

Residence ID:

**Level I:**

Level II;

~~Population:~~

Sample ID	Hazardous Substance	Conc. ( $\mu\text{g}/\text{kg}$ )	RfD (Index)	% of RfD	Cancer Risk Conc. (Index)	% of Cancer Risk Conc.	References
Sum of Percents					Sum of Percents		

SCDM Version: JUN96

Notes: No known soil exposure resident population targets have been documented to date.

# SOIL EXPOSURE PATHWAY WORKSHEET RESIDENT POPULATION THREAT

## LIKELIHOOD OF EXPOSURE

	Score	Data Type	Refs
1. OBSERVED CONTAMINATION: If evidence indicates presence of observed contamination (depth of 2 feet or less), assign a score of 550; otherwise, assign a 0. Note that a likelihood of exposure score of 0 results in a soil exposure pathway score of 0.	0		

LE =

## TARGETS

<p>2. RESIDENT POPULATION: Determine the number of people occupying residences or attending school or day care on contaminated property and within 200 feet of areas of observed contamination (HRS section 5.1.3).</p> <p>Level I: <math>\frac{0}{0}</math> people <math>\times 10 = \frac{0}{0}</math></p> <p>Level II: <math>\frac{0}{0}</math> people <math>\times 1 = \frac{0}{0}</math></p> <p>Sum = 0</p>																										
<p>3. RESIDENT INDIVIDUAL: Assign a score of 50 if any Level I resident population exists. Assign a score of 45 if there are Level II targets but no Level I targets. If no resident population exists (i.e., no Level I or Level II targets), assign 0 (HRS Section 5.1.3).</p>																										
<p>4. WORKERS: Assign a score from the table below for the total number of workers at the site and nearby facilities and within areas of observed contamination associated with the site.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Number of Workers</th><th>Score</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>1 to 100</td><td>5</td></tr> <tr><td>101 to 1,000</td><td>10</td></tr> <tr><td>&gt; 1,000</td><td>15</td></tr> </tbody> </table>	Number of Workers	Score	0	0	1 to 100	5	101 to 1,000	10	> 1,000	15																
Number of Workers	Score																									
0	0																									
1 to 100	5																									
101 to 1,000	10																									
> 1,000	15																									
	10	+	7																							
<p>5. TERRESTRIAL SENSITIVE ENVIRONMENTS: Assign a value for each terrestrial sensitive environment (SI Table 16) in an area of observed contamination.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Terrestrial Sensitive Environment Type</th><th>Value</th></tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p>Sum = 0</p>	Terrestrial Sensitive Environment Type	Value																						+	25	
Terrestrial Sensitive Environment Type	Value																									
<p>6. RESOURCES: Assign a score of 5 if any one or more of the following resources is present on area of observed contamination at the site; assign 0 if none applies.</p> <ul style="list-style-type: none"> <li>• Commercial agriculture</li> <li>• Commercial silviculture</li> <li>• Commercial livestock production or commercial livestock grazing</li> </ul>																										
	0	+	7																							
Sum of Targets T =	10																									

Notes:



# SOIL EXPOSURE PATHWAY WORKSHEET NEARBY POPULATION THREAT

LIKELIHOOD OF EXPOSURE		Score	Data Type	Ref.
7.	Attractiveness/Accessibility (from SI Table 17 or HRS Table 5-6)	Value: <u>5</u>		
	Area of Contamination (from SI Table 18 or HRS Table 5-7)	Value: <u>80</u>		
	Likelihood of Exposure (from SI Table 19 or HRS Table 5-8)	LE = <u>35</u>		

TARGETS		Score	Data Type	Ref.
8.	Assign a score of 0 if Level I or Level II resident individual has been evaluated or if no individuals live within 1/4 mile travel distance of an area of observed contamination. Assign a score of 1 if nearby population is within 1/4 mile travel distance and no Level I or Level II resident population has been evaluated.			
9.	Determine the population within 1 mile travel distance that is not exposed to a hazardous substance from the site (i.e., properties that are not determined to be Level I or Level II); record the population for each distance category in SI Table 20 (HRS Table 5-10). Sum the population values and multiply by 0.1.	6.6		
Sum of Targets T =		7.6		

Notes:

**SI TABLE 16 (HRS TABLE 5-5): SOIL EXPOSURE PATHWAY  
TERRESTRIAL SENSITIVE ENVIRONMENT VALUES**

*	TERRESTRIAL SENSITIVE ENVIRONMENT	ASSIGNED VALUE
	Terrestrial critical habitat for Federal designated endangered or threatened species National Park Designated Federal Wilderness Area National Monument	100
	Terrestrial habitat known to be used by Federal designated or proposed threatened or endangered species National Preserve (terrestrial) National or State terrestrial Wildlife Refuge Federal land designated for protection of natural ecosystems Administratively proposed Federal Wilderness Area Terrestrial areas utilized by large or dense aggregations of animals (vertebrate species) for breeding	75
	Terrestrial habitat used by State designated endangered or threatened species Terrestrial habitat used by species under review for Federal designated endangered or threatened status	50
	State lands designated for wildlife or game management State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25

\* - Check (✓) all environments impacted or potentially impacted by the site.

Notes: No known terrestrial environments.

**SI TABLE 17 (HRS TABLE 5-6);  
ATTRACTIVENESS/ACCESSIBILITY VALUES**

*	AREA OF OBSERVED CONTAMINATION	ASSIGNED VALUE
	Designated recreational area	100
	Regularly used for public recreation (for example, vacant lots in urban area)	75
	Accessible and unique recreational area (for example, vacant lots in urban area)	75
	Moderately accessible (may have some access improvements-for example, gravel road) with some public recreation use	50
	Slightly accessible (for example, extremely rural area with no road improvement) with some public recreation use	25
	Accessible with no public recreation use	10
✓	Surrounded by maintained fence or combination of maintained fence and natural barriers	5
	Physically inaccessible to public, with no evidence of public recreation use	0

\* Check (✓) highest value.

**SI TABLE 18 (HRS TABLE 5-7): AREA OF CONTAMINATION FACTOR  
VALUES**

*	TOTAL AREA OF THE AREAS OF OBSERVED CONTAMINATION (SQUARE FEET)	ASSIGNED VALUE
	≤ to 5,000	5
	> 5,000 to 125,000	20
	> 125,000 to 250,000	40
	> 250,000 to 375,000	60
	> 375,000 to 500,000	80
	> 500,000	100

\* Check (✓) highest value.

Notes: An estimated 8 ft<sup>2</sup> and 403,137 ft<sup>2</sup> of potentially contaminated soil are associated with the effluent pipe and landfill, respectively. The estimated area of potentially contaminated soil for the landfill includes the 450 ft<sup>2</sup> associated with the surface impoundment.

**SI TABLE 19 (HRS TABLE 5-8): NEARBY POPULATION LIKELIHOOD OF  
EXPOSURE FACTOR VALUES**

Area of Contamination Factor Value	Attractiveness/Accessibility Factor Value						
	100	75	50	25	10	5	0
100	500	500	375	250	125	50	0
80	500	375	250	125	50	25	0
60	375	250	125	50	25	5	0
40	250	125	50	25	5	5	0
20	125	50	25	5	5	5	0
5	50	25	5	5	5	5	0

**SI TABLE 20 (HRS TABLE 5-10): DISTANCE-WEIGHTED POPULATION VALUES  
FOR NEARBY POPULATION THREAT**

Travel Distance Category (miles)	Pop.	NUMBER OF PEOPLE WITHIN THE TRAVEL DISTANCE CATEGORY												Pop. Value
		0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,001	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	
Greater than 0 to 1/4	866	0	0.1	0.4	1.0	4	13	41	130	408	1,303	4,081	13,034	13
Greater than 1/4 to 1/2	2,129	0	0.05	0.2	0.7	2	7	20	65	204	652	2,041	6,517	20
Greater than 1/2 to 1	7,293	0	0.02	0.1	0.3	1	3	10	33	102	326	1,020	3,258	33
Sum =														66

References: [11]  
Notes:

# SOIL EXPOSURE PATHWAY WORKSHEET (Concluded)

## WASTE CHARACTERISTICS

		Score
10.	Assign the hazardous waste quantity score calculated for soil exposure	100
11.	Assign the highest toxicity value from SI Table 15a.  Substance(s): _____  Value: _____  From Table: _____	
12.	Multiply the toxicity and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below:	

Product	WC Score	*
0	0	✓
>0 to <10	1	
≥10 to <100	2	
≥100 to <1,000	3	
≥1,000 to <10,000	6	
≥10,000 to <1E+05	10	
≥1E+05 to <1E+06	18	
≥1E+06 to <1E+07	32	
≥1E+07 to <1E+08	56	
≥1E+08 or greater	100	

WC = 0

### RESIDENT POPULATION THREAT SCORE:

(Likelihood of Exposure, Question 1;  
Targets = Sum of Questions 2, 3, 4, 5, 6)

Notes:  $(0 \times 10 \times 0) \div 82,500 = 0$

$$\frac{LE \times T \times WC}{82,500} = 0$$

### NEARBY POPULATION THREAT SCORE:

(Likelihood of Exposure, Question 7;  
Targets = Sum of Questions 8, 9)

Notes:  $(25 \times 7.6 \times 0) \div 82,500 = 0$

$$\frac{LE \times T \times WC}{82,500} = 0$$

### SOIL EXPOSURE PATHWAY CALCULATION:

Resident Population Threat + Nearby Population Threat =

0

(Maximum of 100)

Notes:

## AIR MIGRATION PATHWAY

**Pathway Description and Scoring Notes:** Describe the Air Migration Pathway. Identify the nearest potential receptors of airborne contaminants and the population residing within four miles of the site. Identify any sensitive environments located within the target distance limit.

Briefly discuss any sampling events relative to the Air Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Air Pathway for this site, or any key factors which influenced your scoring rationale.

Various tenants on the Howe property employ approximately 300 full-time personnel [7]. The nearest residence is located approximately 150 feet west of the Howe property at 93 Strongs Avenue. No known schools or day-care centers are located within 200 feet of an area of observed contamination on the property. START personnel observed three classrooms in Building No. 3 (Castleton State College). These classrooms hold seminars for transient students and are not located within 200 feet of a source area. An estimated 23,904 people reside within 4-radial miles of the property [11]. The following table summarizes the estimated population within 4-radial miles of the Howe property.

**Estimated Population Within 4-Radial Miles of  
Howe Richardson Scale Co. (former)**

Radial Distance from Howe Richardson Scale Co. (former) (miles)	Estimated Population
On a Source	300*
> 0.00 to 0.25	866
> 0.25 to 0.50	2,129
> 0.50 to 1.00	7,293
> 1.00 to 2.00	9,031
> 2.00 to 3.00	2,199
> 3.00 to 4.00	2,386
<b>TOTAL</b>	<b>24,204*</b>

\*Includes on-site workers.

[11]

There are approximately 854.5 acres of wetlands within 4-radial miles of the Howe property [13]. Two State-endangered and one State-threatened species habitats are known to be located within 4-radial miles of the property [25]. The following table summarizes the sensitive environments located within 4-radial miles of the Howe property.

## AIR MIGRATION PATHWAY (Continued)

### Sensitive Environments Located Within 4-Radial Miles of Howe Richardson Scale Co. (former)

Radial Distance from Howe Richardson Scale Co. (former)	Sensitive Environments
On a Source	0 acres wetlands Clean Water Act (CWA)
> 0.00 to 0.25	0 acres wetlands
> 0.25 to 0.50	2 acres wetlands
> 0.50 to 1.00	25 acres wetlands
> 1.00 to 2.00	147.5 acres wetlands One occurrence of State-endangered species One occurrence of State-threatened species
> 2.00 to 3.00	360 acres wetlands
> 3.00 to 4.00	320 acres wetlands One occurrence of State-endangered species

[14]

No laboratory qualitative air samples are known to have been collected from the Howe property. Based on the available data, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred, and no impacts to nearby residential populations or sensitive environments are known or suspected.

Note: Mobility equals 1 for all observed release substances

Note: Mobility equals 1 for all observed release substances

Notes: No known air pathway observed release substances have been documented to date.

Note: Convert all results and SCDM values to  $\mu\text{g}/\text{m}^3$  or ppb.

Note: Convert all results and SCDM values to  $\mu\text{g}/\text{m}^3$  or ppb.

If sum of percents calculated for I or J index is  $\geq 100\%$ , consider the targets as Level I, if the sum of I or J index is  $< 100\%$  consider the targets as Level II.

Sample ID:		Level I:	Level II:	Distance from Sources (mi):			References:	
Hazardous Substance	Conc. ( $\mu\text{g}/\text{m}^3$ )	Toxicity/ Mobility	Benchmark Conc. (NAAQS or NESHAPS)	% of Benchmark	RfD (Index)	% of RfD	Cancer Risk Conc. (J index)	% of Cancer Risk Conc.
	Highest Tox. × Mobility		Highest Percent		Sum of Percents		Sum of Percents	

Notes: No known air pathway actual contamination targets have been documented to date.



# AIR PATHWAY WORKSHEET

## LIKELIHOOD OF RELEASE

	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation support a release to air, assign a score of 550. Record observed release substances on SI Table 21.			
2. POTENTIAL TO RELEASE: If sampling data do not support a release to the air, assign a score of 500. Optionally, evaluate air migration gaseous and particulate potential to release (HRS Section 6.1.2).	500	-	

LR =

## TARGETS

TARGETS		Score	Data Type	Refs																
3. ACTUAL CONTAMINATION POPULATION: Determine the number of people within the target distance limit subject to exposure from a release of a hazardous substance to the air.  Level I: <u>0</u> people $\times 10 =$ <u>0</u> Level II: <u>0</u> people $\times 1 =$ <u>0</u> <div>Total</div> 0		0																		
4. POTENTIAL TARGET POPULATION: Determine the number of people within the target distance limit not subject to exposure from a release of a hazardous substance to the air using SI Table 22. Sum the values and multiply by 0.1.		49.9	+	7; 11																
5. NEAREST INDIVIDUAL: Assign a score of 50 if there are any Level I targets. Assign a score of 45 if there are Level II targets but no Level I targets. If no Actual Contamination Population exists, assign the Nearest Individual score from SI Table 23.		20																		
6. ACTUAL CONTAMINATION SENSITIVE ENVIRONMENTS: Sum the sensitive environment values (SI Table 13) and wetland acreage values (SI Table 23) for environments subject to exposure from the release of a hazardous substance to the air. <table><tr><td>Sensitive Environment Type</td><td>Value</td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td>Wetland Acreage</td><td>Value</td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>		Sensitive Environment Type	Value							Wetland Acreage	Value									
Sensitive Environment Type	Value																			
Wetland Acreage	Value																			
7. POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS: Use SI Table 24 to evaluate sensitive environments not subject to exposure from a release.		0.924	+	13; 23																
8. RESOURCES: Assign a score of 5 if one or more air resources applies within ½ mile of a source; assign a 0 if none applies <ul style="list-style-type: none"><li>Commercial agriculture</li><li>Commercial silviculture</li><li>Major or designated recreation area</li></ul>		5	-																	
Sum of Targets T =		75.824																		

Notes: Resources value was assumed.

## AIR PATHWAY WORKSHEET (Concluded)

### WASTE CHARACTERISTICS

<p>9. If any Actual Contamination Targets exist for the air pathway, assign the calculated hazardous waste quantity score or a score of 100, whichever is greater; if there are no Actual Contamination Targets for the air pathway, assign the calculated HWQ score for sources available for air migration.</p>	Score <b>100</b>																						
<p>10. Assign the highest air toxicity × mobility value from SI Table 21a or SI Table 3.</p> <p>Substance(s): <u>Trichloroethane 1,1,2-</u>      <u>Carbon tetrachloride</u>      <u>Benzene</u></p> <p>Value:      <u>1,000</u>      <u>1,000</u>      <u>100</u></p> <p>From Table: <u>3</u>      <u>3</u>      <u>3</u></p>	<b>1,000</b>																						
<p>11. Multiply the toxicity and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below:</p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Product</th> <th>WC Score</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>&gt;0 to &lt;10</td><td>1</td></tr> <tr><td>≥10 to &lt;100</td><td>2</td></tr> <tr><td>≥100 to &lt;1,000</td><td>3</td></tr> <tr><td>≥1,000 to &lt;10,000</td><td>6</td></tr> <tr><td>≥10,000 to &lt;1E+05</td><td>10</td></tr> <tr><td>≥1E+05 to &lt;1E+06</td><td>18</td></tr> <tr><td>≥1E+06 to &lt;1E+07</td><td>32</td></tr> <tr><td>≥1E+07 to &lt;1E+08</td><td>56</td></tr> <tr><td>≥1E+08 or greater</td><td>100</td></tr> </tbody> </table>	Product	WC Score	0	0	>0 to <10	1	≥10 to <100	2	≥100 to <1,000	3	≥1,000 to <10,000	6	≥10,000 to <1E+05	10	≥1E+05 to <1E+06	18	≥1E+06 to <1E+07	32	≥1E+07 to <1E+08	56	≥1E+08 or greater	100	<p><b>WC =</b>      <b>18</b></p>
Product	WC Score																						
0	0																						
>0 to <10	1																						
≥10 to <100	2																						
≥100 to <1,000	3																						
≥1,000 to <10,000	6																						
≥10,000 to <1E+05	10																						
≥1E+05 to <1E+06	18																						
≥1E+06 to <1E+07	32																						
≥1E+07 to <1E+08	56																						
≥1E+08 or greater	100																						

Multiply LR by T and by WC. Divide the product by 82,500 to obtain the air migration pathway score. If the pathway score is greater than 100, assign 100.

### AIR MIGRATION PATHWAY CALCULATION:

$$\frac{LE \times T \times WC}{82,500} =$$

**8.27**

(Maximum of 100)

Notes:  $(500 \times 75.824 \times 18) \div 82,500 = 8.27$

SI TABLE 22 (FROM HRS TABLE 6-17): VALUES FOR POTENTIAL CONTAMINATION AIR TARGET POPULATIONS

Distance From Site	Pop.	Nearest Individual (choose highest)	NUMBER OF PEOPLE WITHIN THE DISTANCE CATEGORY												Pop. Value
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1000	1001 to 3000	3001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	
On a source	300	20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455	164
0 to 1/4 mile	866	*	1	4	13	41	131	408	1,304	4,081	13,034	40,812	130,340	408,114	131
> 1/4 to 1/2 mile	2,129	2	0.2	0.9	3	9	28	88	282	882	2,815	8,815	28,153	88,153	88
> 1/2 to 1 mile	7,293	1	0.06	0.3	0.9	3	8	26	83	261	834	2,612	8,342	26,119	83
> 1 to 2 miles	9,031	0	0.02	0.09	0.3	0.8	3	8	27	83	266	833	2,659	8,326	27
> 2 to 3 miles	2,199	0	0.009	0.04	0.1	0.4	1	4	12	38	120	375	1,199	3,755	4
> 3 to 4 miles	2,386	0	0.005	0.02	0.07	0.2	0.7	2	7	28	73	229	730	2,285	2
Nearest Individual =		20	Sum =												499

\*Score = 20 if the Nearest Individual is within 1/8 mile of a source; score = 7 if the Nearest Individual is between 1/8 and 1/4 mile of a source.

[7; 11]

Notes:

**SI TABLE 23 (HRS TABLE  
6-18): AIR PATHWAY  
VALUES FOR WETLAND AREA**

*	WETLAND AREA	ASSIGNED VALUE
	< 1 acre	0
	1 to 50 acres	25
	> 50 to 100 acres	75
	> 100 to 150 acres	125
	> 150 to 200 acres	175
	> 200 to 300 acres	250
✓	> 300 to 400 acres	350
	> 400 to 500 acres	450
	> 500 acres	500

\* Check (✓) highest value.

Notes: A - state-endangered species  
B - state-threatened species

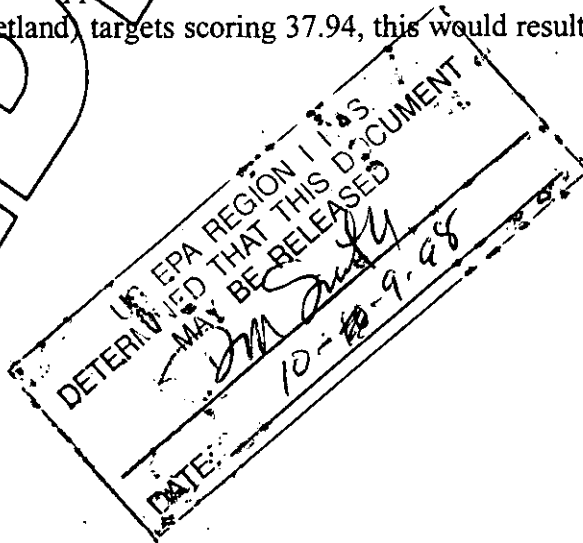
**SI TABLE 24: DISTANCE WEIGHTS AND  
CALCULATIONS FOR AIR PATHWAY POTENTIAL  
CONTAMINATION SENSITIVE ENVIRONMENTS**

DISTANCE	DISTANCE WEIGHT	SENSITIVE ENVIRONMENT TYPE AND VALUE (FROM SI TABLES 13 AND 23)	PRODUCT
On a Source	0.10	× 0 acres of wetlands (0)	0
		× Clean Water Act (5)	0.5
0 to 1/4 mile	0.025	× 0 acres of wetlands (0)	0
		×	
1/4 to 1/2 mile	0.0084	×	
		×	
1/4 to 1/2 mile	0.0084	× 2 acres of wetlands (25)	0.135
		×	
1/2 to 1 mile	0.0016	×	
		×	
1/2 to 1 mile	0.0016	× 25 acres of wetlands (25)	0.04
		×	
1 to 2 miles	0.0005	×	
		×	
1 to 2 miles	0.0005	× 147.5 acres of wetlands (125)	0.0625
		× 1 occurrence of A (50)	0.025
1 to 2 miles	0.0005	× 1 occurrence of B (50)	0.025
		×	
2 to 3 miles	0.00023	× 350 acres of wetlands (350)	0.0805
		×	
2 to 3 miles	0.00023	×	
		×	
3 to 4 miles	0.00014	× 320 acres of wetlands (350)	0.049
		×	
3 to 4 miles	0.00014	× 1 occurrence of A (50)	0.007
		×	
> 4 miles	0	×	0
Total Environments Score =			0.924

SITE SCORE CALCULATION		S	S
GROUNDWATER PATHWAY SCORE ( $S_{GW}$ )		26.07	679.65
SURFACE WATER PATHWAY SCORE ( $S_{SW}$ )		9.64	92.93
SOIL EXPOSURE PATHWAY SCORE ( $S_{SE}$ )		0	0
AIR PATHWAY SCORE ( $S_A$ )		8.27	68.39
SITE SCORE		$\sqrt{\frac{S_{GW}^2 + S_{SW}^2 + S_{SE}^2 + S_A^2}{4}} = 14.50$	

#### COMMENTS:

**Alternate Scenario:** If sampling data or direct observation supported observed release to the surface water pathway, with Level II fishery and sensitive environment (CWA, wetland) targets scoring 37.94, this would result in a site score of 23.38.



#### WARNING!!

EPA has determined that the HRS score of any site that is progressing towards listing on the NPL is confidential. Deliberations regarding scoring or listing issues, the site specific status, and HRS scores cannot be released or discussed with non-Agency persons. For additional guidance see the April 30, 1993 OSWER Directive 9320.1-11.

**HOWE RICHARDSON SCALE CO. (FORMER)**  
**REFERENCES**

- [1] Fluor Technology, Inc. Environmental Services. 1986. Environmental Characterization of the Howe Richardson Scale Co. (former) Site. April.
- [2] US EPA (U.S. Environmental Protection Agency). 1984. Preliminary Assessment, Howe Richardson Scale Co. (former). Site No. VTD 002078509. 17 December.
- [3] PJD, Inc. 1984. Letter to Nancy Pilgion (US EPA), RE: Groundwater Monitoring at Howe Richardson Scale Co. (former). 10 December.
- [4] ATC Environmental, Inc. 1997. Quarterly Monitoring Activities. July.
- [5] Howe Center, Ltd. 1997. Howe Center Tenant List. 24 September.
- [6] Panza, P. (START). 1998. Project Note, RE: Howe Richardson Scale Co. (former) Groundwater Level Calculation. TDD No. 97-04-0015. 16 January.
- [7] START. 1997. Field Logbook for Howe Richardson Scale Co. (former) Site Inspection No. 00222-S. TDD No. 97-04-0015. 16 October.
- [8] Dennison Environmental Services, Inc. 1992. Report No. 10, RE: Summary of Quarterly Monitoring Activities. 13 March.
- [9] Umstot, K. (START). 1997. Phone Conversation Record with Howard Burgess (Rutland City Hall), RE: Public Water Supplies for Rutland Fire District No. 1. TDD No. 97-02-0038. 17 April.
- [10] Vermont Department of Health, Division of Environmental Health. 1990. Vermont Public Water Systems List. February.
- [11] Frost Associates. 1997. CENTRACTS Data Report. Howe Richardson Scale Co. (former) TDD No. 97-04-0015. 30 July.
- [12] Panza, P. (START). 1998. Project Note, RE: Howe Richardson Scale Co. (former), Flow Rate Calculations of Otter Creek, and Moon Brook. TDD No. 97-04-0015. 19 January.
- [13] Panza, P. (START). 1998. Project Note, RE: Wetland Distribution and Frontage for Howe Richardson Scale Co. (former) TDD No. 97-04-0015. 22 January.
- [14] DeLorme Publishing Company. 1986. Vermont Atlas and Gazetteer. Undated.

**HOWE RICHARDSON SCALE CO. (FORMER)**  
**REFERENCES (Continued)**

- [15] Panza, P. (START). 1998. Project Note, RE: Howe Richardson Scale Co. (former) Calculation of Soil Contamination. TDD No. 97-04-0015. 5 January.
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